

Comprehensive Nutrient Management Plan

Riverland Dairy Farm

**Prepared by Dennis J Godar
In Cooperation With the
Polk County Soil and Water Conservation District
Date Prepared: 1/12/2012**



For Years; 2012-2016

Operation Name: **Riverland Dairy Farm**
Owner / Operator's Name: **Rex Calfee**
Mailing Address: **4660 Upper River Road NE
Charleston, TN 37310**

Farm Address: **4660 Upper River Road NE
Charleston, TN 37310**
Operation Telephone Number: **(423) 715-0391 cell
(432) 338-0008 farm**

Conservation Planner

As a Conservation Planner, I certify that I have reviewed both the *Comprehensive Nutrient Management Plan* and *Producer Nutrient Management Activities* documents for technical adequacy and that the elements of the documents are technically compatible, reasonable and can be implemented.

Signature: _____ Date: _____
Name: _____
Title: _____ Certification Credentials: _____

Conservation District

The Conservation District has reviewed the CNMP documents and concurs that the plan meets the District's goals.

Signature: _____ Date: _____
Name: _____
Title: _____

Owner/Operator

As the owner/operator of this CNMP, I, as the decision maker, have been involved in the planning process and agree that the items/practices listed in each element of the CNMP are needed. I understand that I am responsible for keeping all the necessary records associated with the implementation of this CNMP. It is my intention to implement/accomplish this CNMP in a timely manner as described in the plan.

Signature: _____ Date: _____
Name: _____

Section 2. Manure and Wastewater Handling and Storage

Signature: _____ Date: _____
Name: _____
Title: _____ Certification Credentials: _____

Sections 4. Land Treatment

Signature: _____ Date: _____
Name: _____
Title: _____ Certification Credentials: _____

Section 6. Nutrient Management

The Nutrient Management component of this plan meets the Tennessee Nutrient Management 590 and Waste Utilization 633 Conservation Practice Standards.

Signature: _____ Date: _____
Name: _____
Title: _____ Certification Credentials: _____

Section 7. Feed Management (if applicable)

Signature: _____ Date: _____
Name: _____
Title: _____ Certification Credentials: _____

Section 8. Other Utilization Options (if applicable)

Signature: _____ Date: _____
Name: _____
Title: _____ Certification Credentials: _____

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Section 1. Background and Site Information

Purpose of the Comprehensive Nutrient Management Plan (CNMP)

The Comprehensive Nutrient Management Plan (CNMP) is a conservation system for your animal feeding operation. It is designed to address, at a minimum, the soil erosion and water quality concerns on your operation. The following soil erosion and water quality concerns have been identified on your farm:

Manure and Nutrient Management is managing the source, rate, form, timing, placement and utilization of manure, other organic by-products, bio-solids, and other nutrients in the soil and residues. The goal is to effectively and efficiently use the nutrient resources to adequately supply soils and plants to produce food, forage, fiber, and cover while minimizing the transport of nutrients to ground and surface water and environmental degradation.

Nitrogen and Phosphorus vs. Water Quality

Nitrogen and Phosphorus are two nutrients that have the potential to impair the quality of our groundwater and surface water. Nitrogen leaching out the root zone may enter a tile and be transported to surface water or it may leach to the groundwater. The EPA Drinking Water Maximum Contaminant Level (MCL) for Nitrates is 10 mg/L. Phosphorus leachate, or runoff entering the surface water may contribute to excessive algae growth which may cause low oxygen levels in surface water. This in turn may impair aquatic life. This manure and nutrient management plan will help to protect the groundwater and surface water.

1.1. General Description of Operation

Riverland Farms is a dairy operation with approximately 650 milking cows and an additional 50 head of heifer calves in total confinement. Approximately 100 to 120 growing heifers and dry cows are not confined and raised on rotational pastures. The dairy is operated Rex Calfee and family.

Approximately 716 acres of spreadable cropland and pastures are included in this CNMP.

The farm fields are located in a rural area with rolling uplands and bottomland fields along the Hiwassee River and the Chicamauga Reservoir in northwest Polk County, Tennessee. The fields are surface drained through field ditches and intermittent streams to the northeast and northwest directly into the Hiwassee River. Most of the soils along the river bottoms will have high water tables in the spring. Land use in the area is mostly cropland, pastures and hayfields. Conservation practices implemented in the fields and pastures include: grass buffer strips and riparian areas that border the river. Buffers that are properly maintained help to reduce impacts of soil erosion and nutrient runoff from fields. Grass buffer strips and riparian buffers also provide good wildlife habitat along the streams.

There are approximately 2 dozen non-farm residences located within a half mile of the facilities. General topography of the area is 0-15 %.

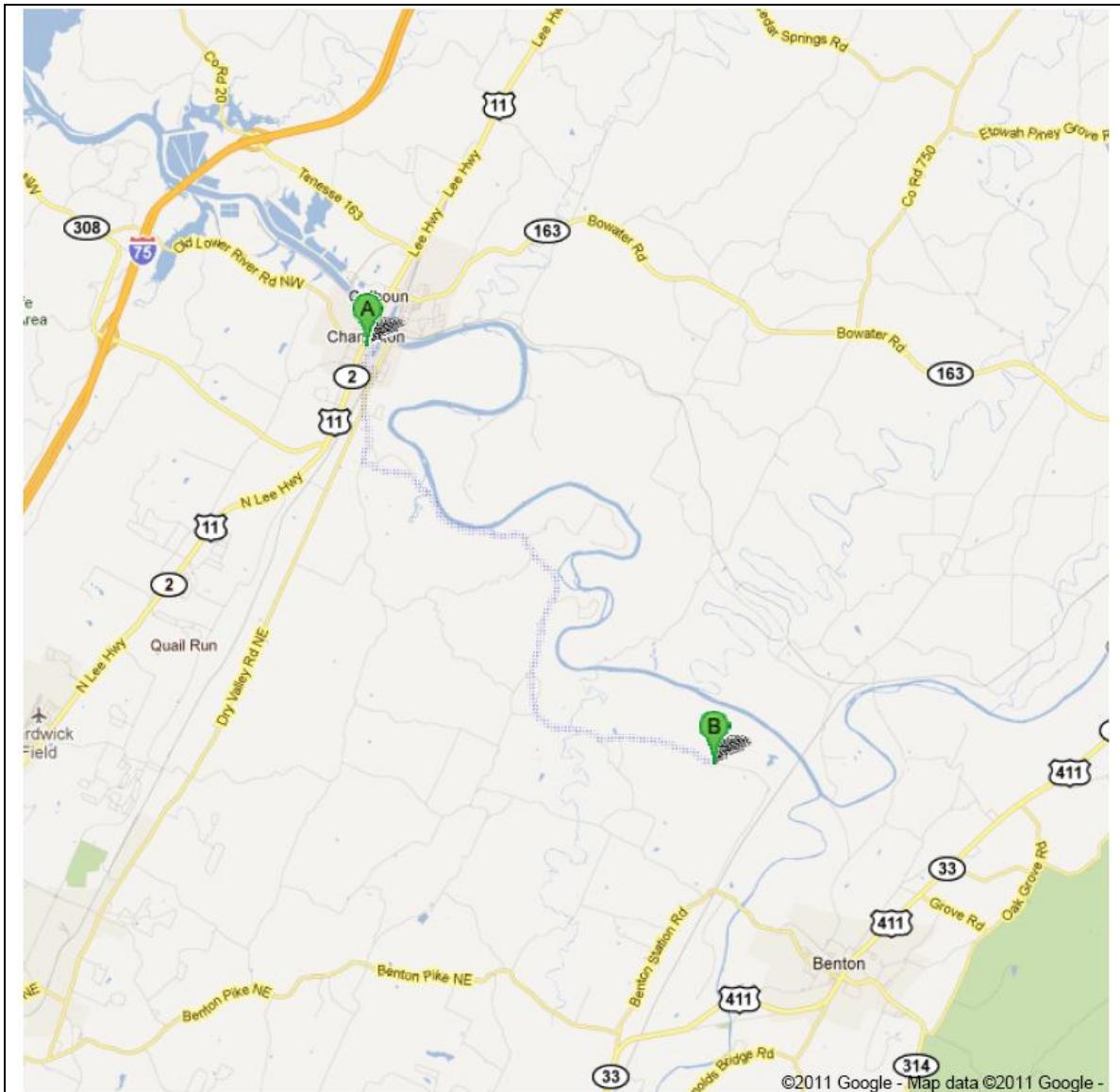
The fields and the facilities for the operation are located in the Hiwassee River-Parker Branch sub-watershed, (12-digit HUC: 060200021403) and the Chickamauga Lake-Hiwassee River-10-digit watershed, (0602000214). This area is part of the 8-digit HUC: 06020002 Sub-basin known as the Hiwassee Watershed.

(See watershed reports at the end of this section).

1.2. Sampling, Calibration and Other Statements

- Manure sampling frequency: All solid and liquid manure from the lagoons will be sampled and analyzed annually. Use best management procedures for sampling found in manure testing references in Section 6.
- Soil testing frequency: Soil testing should be done a minimum of every four years, or sooner. Soil testing is an important tool to manage soil fertility with proper use of manure and fertilizers according to crop needs. Use best management procedures for sampling found in soil testing references in Section 6.
- Equipment calibration should be accomplished annually and whenever changing rates. For surface applied solids, use of the 'tarp' method also is a check on uniformity of applications. For drag hose operations a flow-meter is recommended to monitor gallons applied. A staff gage in the storage pond also helps to estimate gallons applied. For irrigation or surface application of liquid manure, buckets placed in the field can help measure uniformity and also catch samples 'as applied.'
- Measures to prevent direct contact of animals with water: Dairy cows, when housed inside of barns will have no contact with water resources. Grazing animals should be restricted from having free access to streams. Improved stream crossings should be maintained and exclusion fences are recommended in sensitive areas.
- Silage leachate from the bunk silo is managed by draining from the floors to a vegetated treatment area. This area need to be maintained so that channelized flow does not occur. Vegetation in treatment areas or filter strips should be cut for hay periodically to remove nutrients or could be flash-grazed if conditions allow without excessive damage to the vegetation.

Location & Driving Directions:



A Charleston, TN

1. Head **southeast** on **Cass St** toward **Broadway St NE**
go 466 ft
total 466 ft
 2. Take the 1st right onto **Broadway St NE**
About 1 min
go 0.2 mi
total 0.3 mi
 3. Turn left onto **Wool St NE**
go 0.2 mi
total 0.5 mi
 4. Take the 2nd right onto **Railroad St**
About 1 min
go 0.2 mi
total 0.7 mi
 5. Continue onto **Chatata Valley Rd NE**
About 3 mins
go 1.0 mi
total 1.7 mi
 6. Turn left onto **Upper River Rd NE**
About 18 mins
go 7.2 mi
total 8.8 mi

 B Upper River Rd

Resource Concerns

Soil Quality Concerns

	<i>Soil Quality Concern</i>	<i>Fields</i>
X	Ephemeral Gully Erosion	Minimum tillage and winter cover crops are practiced. All fields are within ‘Tolerable’ soil loss limits. (T values) according to the RUSLE2 program. Pastures and hay fields maintain good cover to reduce erosion.
X	Sheet and Rill Erosion	Several intermittent streams run through the operation. Stream crossings need to be monitored constantly for damage and rutting from cattle traffic.
X	Stream/Ditchbank Erosion	Several intermittent streams run through the operation. Stream crossings need to be monitored constantly for damage and rutting from cattle traffic.
	Wind Erosion	Not a problem here.

Soil Erosion/Soil Quality:

This farm practices conservation practices to minimize erosion and improve soil quality. These practices include: Rotational grazing, Fencing, Travel Lanes, Stream Crossing, Buffers and Setbacks. Stock watering systems and this nutrient management plan will also help improve productivity of the grazing system. More information on conservation practices, and “RUSLE 2” individual field profiles (soil loss estimate reports); can be found in Part 4, “Land Treatment Practices”. Gully formation is a concern in a few cattle traffic lanes in steeper areas.

Water Quality Concerns

	<i>Water Quality Concern</i>	<i>Fields</i>
X	Facility Wastewater Runoff	All wastewater and facility runoff is flushed to a collection pit and transferred to the storage pond.
X	Manure Runoff (Field Application)	All fields: manure runoff is avoided by not applying at excessive rates, and maintaining a minimum of 40' vegetated buffer along streams.
X	Manure Runoff (From Facilities)	Lot runoff is curbed and collected to drain to the transfer pit and pumped to the storage pond.
X	Nutrients in Groundwater	All fields: nutrient leaching is minimized by not over applying nutrients and using appropriate rates, timing and application methods for manure and fertilizer applications. Soil types have medium to low leaching risks.
X	Nutrients in Surface Water	All fields: in addition to rates and timing considerations listed above, grass waterways and buffer strips along the surface streams and pond are established.
X	Silage Leachate	Silage leachate is collected and treated through a grass filter strip. Feed commodities are stored in sheds.
X	Excessive Soil Test Phosphorus	Several fields have high soil P levels but only Field 5 is greater than 300 lbs/acre according to 2011 soil tests. Manure will be applied at less than P removal for Field 5. Nutrient plan allows manure applications on other fields at nitrogen based rates.
	Tile-Drained Fields	None

Water Quality:

This farm practices conservation practices to improve water quality for the farm as well as the surrounding watersheds. Surface water is protected from erosion and surface runoff of nutrients by manure application setbacks, filter strips, nutrient management and rotational grazing to reduce erosion and maximize grass & legume growth. Water has been piped to several waterers in the pastures. One concern is the cattle drinking directly from the streams which can result in stream bank erosion from cattle traffic. It is recommended to fence the sensitive areas along the streams. These areas can be flash grazed intermittently to keep vegetation grazed down. This practice would also be beneficial for wildlife.

Other Concerns Addressed

	Other Concern	Fields
	Acres Available for Manure Application	Adequate acres are available for liquid from the dairy storage pond.
	Aesthetics	Farm is very well maintained and has good appearances from the road and around the farmstead.
	Maximize Nutrient Utilization	Liquid Manure and dry bedded-pack manure is applied to silage & hay fields and pastures to maintain soil nutrients.
	Minimize Nutrient Costs	Commercial fertilizers are minimized. Manure is the basis of the sustainability of the farm.
	Neighbor Relations	No problems, good management of facilities should help keep good neighbor relations.
	Profitability	Home grown forages and good use of manure nutrients to make the operation more sustainable. Cows' longevity, herd health and productivity all contribute to good profitability.
	Regulations	CNMP meets TN CAFO regulations that apply to Class 2 CAFO operations.
	Soil Compaction	To reduce compaction, avoid manure applications in early spring or whenever soil is too wet.
	Time Available for Manure Application	Grazing and forage operations allow applications throughout the growing season as needed.
	Odors	Flushing scrape alleys and daily scraping of manure helps to minimize odors in the barn. Injecting liquid manure also minimizes odors from applications.
	Air Quality	Keeping manure cleaned out of the freestall barns minimizes odors in the barn. Stir fans and ridge vents also help to improve air quality inside the pack barn.
	Biosecurity	Farm has a bio-security plan and is a good location for the operation. Restricted entry signs should be posted to help control unnecessary traffic in and out of the farm driveway. Workers should not visit other farms on same day and wear clean clothes and boots to the farm.

Other Concerns:

Air quality is another important resource to maintain. Feed management, manure storage and handling methods are planned that will help to minimize dust and odors generated by this operation. Forage quality management for this operation is also an important concern to keep the cattle doing well grazing on pastures and for hay.

Clean Water Diversions

Clean water is being diverted away from possible contamination with manure or feed. All contaminated water will be collected and placed into one of the waste storage ponds, hauled directly to the field or diverted into filter strips that have been installed to absorb excess nutrients.

Animal Contact with surface water

Fences have been constructed to minimize any contact by the livestock with surface water. Where ponds may be utilized as a source of water for livestock, access will be limited.

Manure Transfer - Spillage

All areas of manure transfer shall be maintained to immediately clean up any spillage. If necessary and practicable, treatment options such as concrete pads, curbs, and bump walls shall be installed adjacent to manure storage and load-out areas to facilitate proper cleanup.

Manure Transfer – Road

Manure transport units will be maintained in good condition. Manure will not be allowed to spill on roadways, or other unauthorized areas. Sealed truck bodies, canvas covers, wetting down dry material and not overloading spreaders are some of the methods that can be used to prevent spilling. Additionally, cleaning of the transport and application units will be done in a manner that does not allow nutrient loading that would be detrimental to soil, air, plant, water or animal recourses.

Waste Storage Closure Plan

If livestock production ceases at this location, the facilities shall be cleaned up to insure all remaining nutrient sources are removed. Closure will meet or exceed all USDA-NRCS practice standards applicable to closing a waste storage facility, including "Closure of Waste Impoundments (360). All manure and nutrients and waste water shall be removed and applied to available cropland following agronomic rates following USDA-NRCS nutrient management and waste utilization standards and specifications.

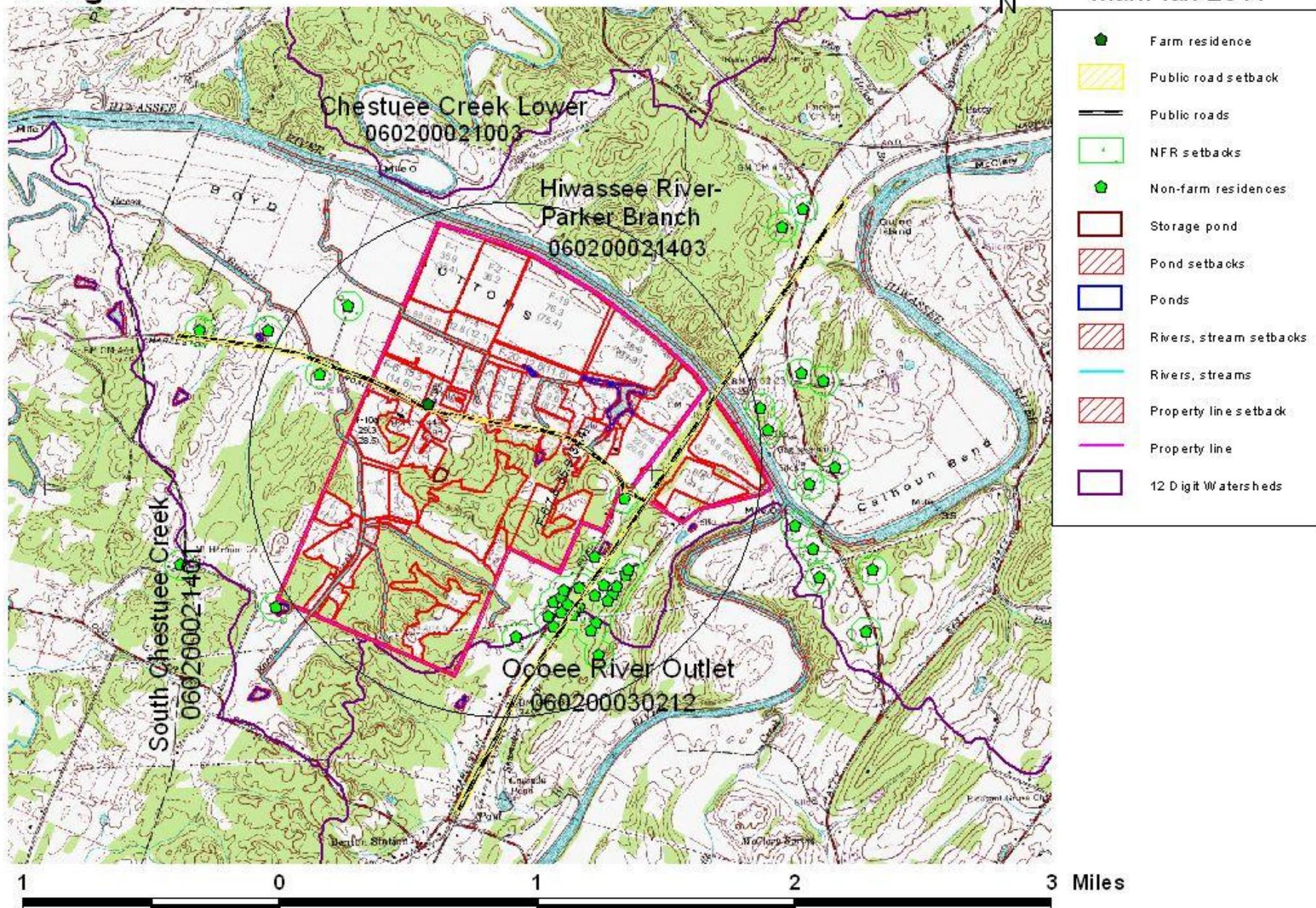
See *Lagoon Closure Plan in Section 2, page 24.*

Watershed Map

12 digit-HUCs



ManPlan 2011

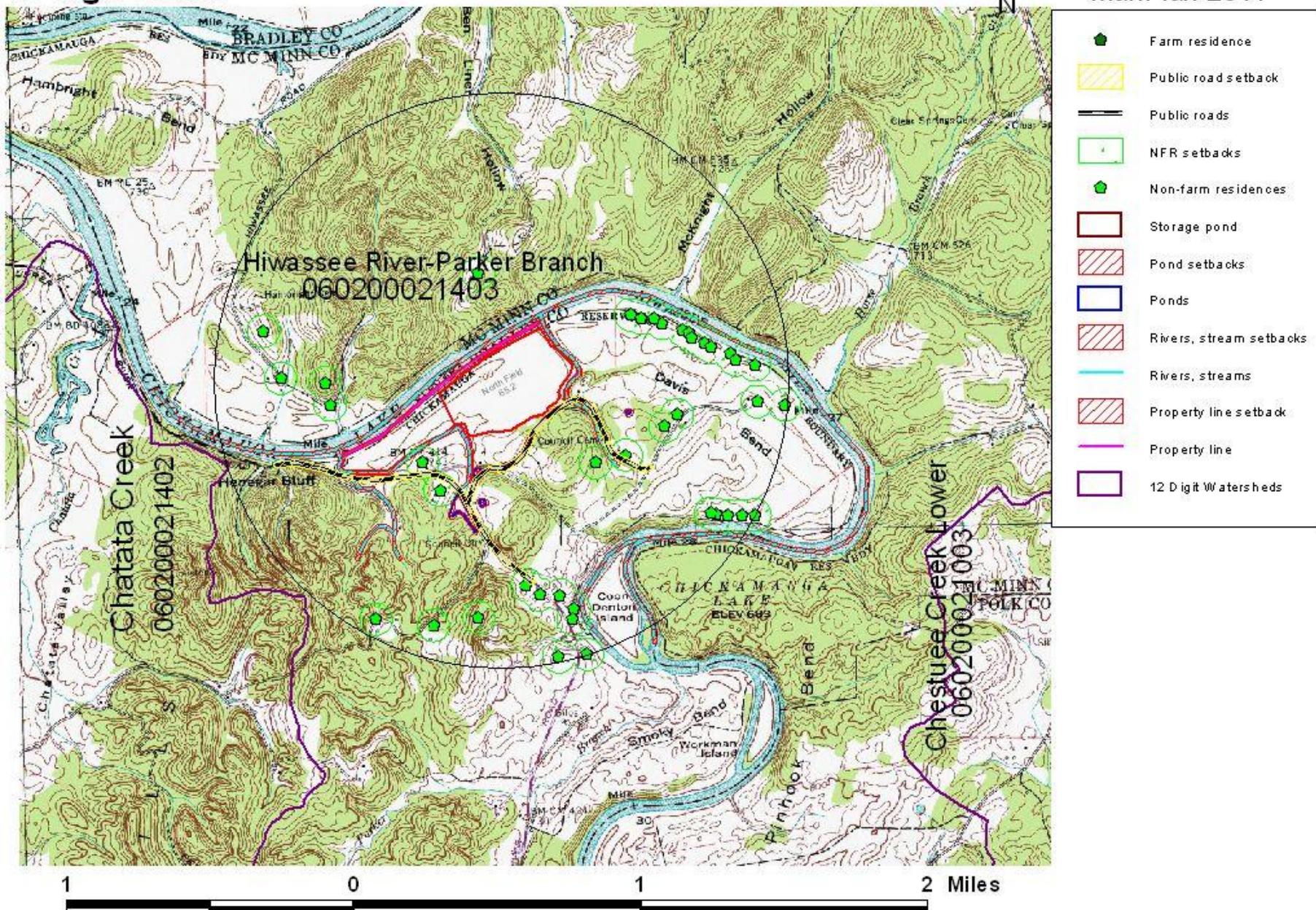


Watershed Map

12 digit-HUCs



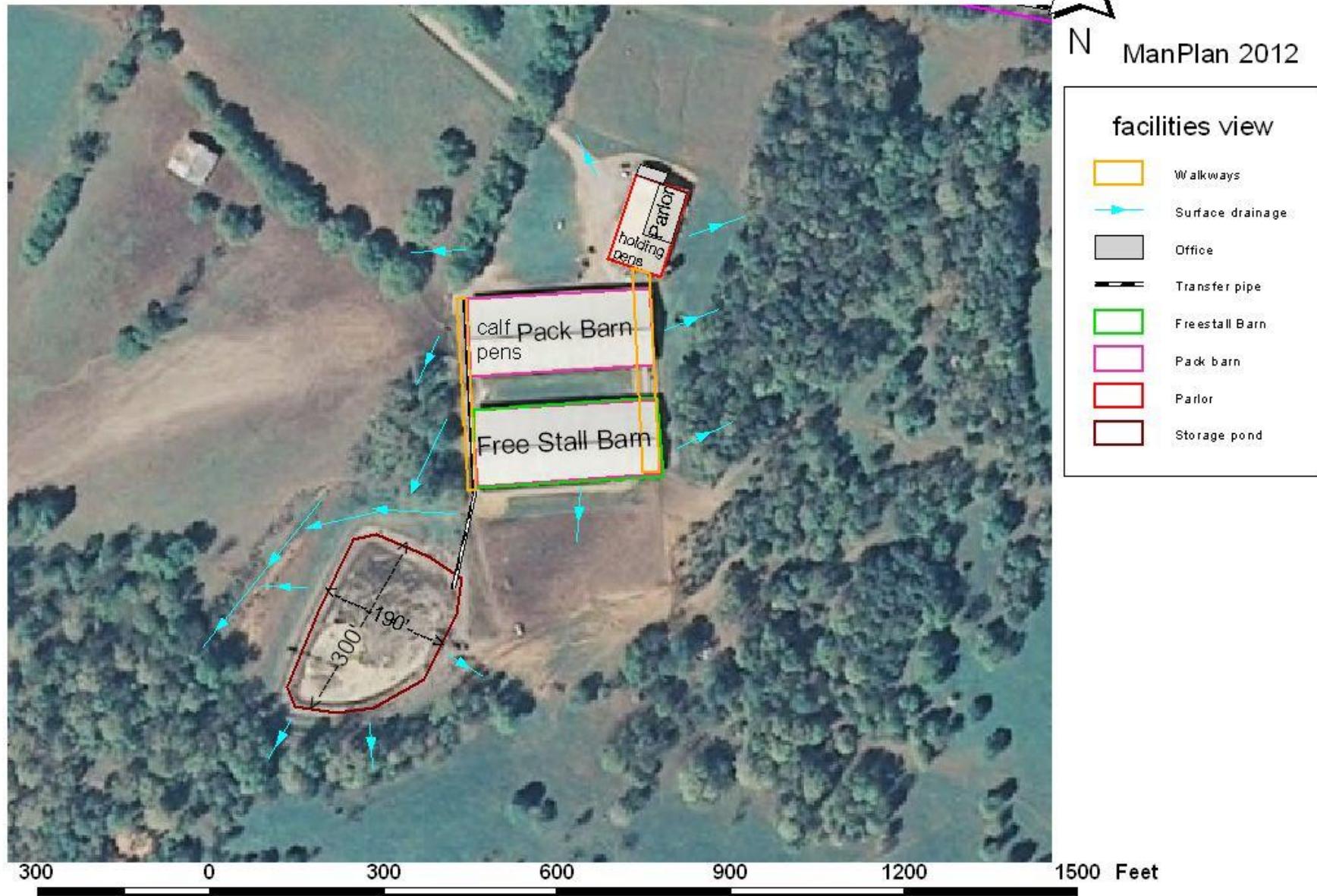
ManPlan 2011



Section 2. Manure and Wastewater Handling and Storage

2.1. Map(s) of Production Area

Riverland Dairy CNMP Facilities



2.2. Production Area Topographical Map

Riverland Dairy
CNMP Facilities



2.1 Animal and Manure Resources

Total manure produced estimates were made using the Animal Waste Management program and AWM reports are included in this section. Tables 2-3 and 2-4 summarizes animal inventories and manure storage capacities.

Liquid manure:

A liquid storage pond was constructed in 2003 with NRCS designs (see in Section 10). Estimated capacity of the storage pond is approximately 7 months and over 3,000,000 gallons operating capacity. Total capacity is approximately 4,500,000 gallons to the top of the spillway. Liquids are agitated with a 50 foot Prop agitator during removal to achieve a more uniform nutrient content in the manure and to remove solids that settle to the bottom of the storage pond.

It is estimated that approximately **8,000,000 gallons of liquid manure and wastewater** is produced annually and planned to be applied in spring and fall on cropland hayfields and pastures.

Liquid manure is usually applied by a custom contractor to inject manure in crop fields in the spring. A manure transfer pipeline has been installed to facilitate operation of an umbilical system which drags a manure hose across the fields while injecting the manure in the soil. The transfer pipeline may also be used to operate a traveling gun which may be preferred on pastures in the late summer or early fall.

Solid manure & Compost

It is estimated that approximately **700 tons of solid bedded manure pack** will be produced annually from the pack barn, which houses springers and freshening milk cows. Another **180 to 200 tons of bedded manure** per year are produced from the calf pens and hutches. Solid manure is cleaned out of the pack barn in spring and fall, and calf manure may be hauled as needed, through spring summer and fall.

The solid manure will be surface applied to fields and pastures in this NMP with a tandem axle Kuhn-Knight solids-slurry spreader.

The solid manure is a good resource to applied to fields located further from the dairy facilities as it is easier to transport than liquids. Bedded manure may also be composted on-site by piling in a composting area and turning occasionally to facilitate the composting process.

2.3. Manure Storage

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
Storage pond	Holding pond	4,600,000 Gal	8,000,000 Gal	210
Dry pack	Manure pack	450 Tons	700 Tons	235
calf pens	Dairy manure dry stack	100 Tons	190 Tons	192

2.4. Animal Inventory

Animal Group	Type or Production Phase	Number of Animals	Average Weight (Lbs)	Confinement Period	Manure Collected (%)	Storage Where Manure Will Be Stored
Milk Cows Groups 1&2	Milk cow (dairy)	270	1,300	Jan Early - Dec Late	100	Storage pond
Milk Cows Groups 3&4	Milk cow (dairy)	380	1,300	Jan Early - Dec Late	100	Storage pond
Springer-heifers	Breeding heifer (dairy)	25	970	Jan Early - Dec Late	100	Pack barn
Calves	Calf (dairy)	50	250	Jan Early - Dec Late	100	calf pens

- (1) Number of Animals is the average number of animals that are present in the production facility at any one time
(2) If Manure Collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or that the production facility is unoccupied one or more times during the confinement period.

Parlor



Freestall barns-flush-alley.



Pack Barn



Cow walkway/ Flush alley on east side of barns.



2.5. Normal Mortality Management

To decrease non-point source pollution of surface and ground water resources, reduce the impact of odors that result from improperly handled animal mortality, and decrease the likelihood of the spread of disease or other pathogens, approved handling and utilization methods shall be implemented in the handling of normal mortality losses. If on-farm storage or handling of animal mortality is done, NRCS Standard 316, Animal Mortality Facility, will be followed for proper management of dead animals.

Plan for Proper Management of Dead Animals

Burial on site is the normal planned mortality management practice following proper procedures: Burial sites are a minimum of 300 feet from any well head, 165 feet from property lines or public use area, more than 100 feet from waters of the state or wet weather conveyance, (waterways etc), and in deep suitable soils more than 2 feet above bedrock and ground water table. Ground water shall be greater than 2 feet below the bottom of the burial pit or trench. Suitable burial locations are on Waynesboro Loam soil (WbB2) on areas that are not too steep. See facility soil map with burial location on page 44.

*Alternative mortality management methods are to send to a rendering facility or composting.
(See page 51 of Section 3 Emergency Action Plan, for rendering company information)*

It is a priority of the operation to handle mortalities promptly, removing them from the facilities as soon as possible after discovery and placing them mortality storage area.

Finished compost may be applied to the fields in this NMP. Compost shall be analyzed for nutrients at least annually for total Nitrogen (N), Ammonia (NH₃), phosphates, (P₂O₅) and potassium oxide (K₂O). A copy of compost analysis shall be provided to the recipient for determining proper agronomic rates for land applications. Records of applications and transfers of compost shall be kept as part of the nutrient management plan. Additional discussion of contingency planning for proper animal disposal in case of catastrophic deaths and can be found in Section 3, page 51, under the Emergency Action Plan.

2.6. Planned Manure Exports off the Farm

Month-Year	Manure Source	Amount	Receiving Operation	Location
(None)				

2.7. Planned Manure Imports onto the Farm

Month-Year	Manure's Animal Type	Amount	Originating Operation	Location
(None)				

2.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination
(None)			

Lagoon Closure Plan

If the storage facility is no longer used for manure storage and treatment, it shall be closed as follows:

- Agitate and pump out as much manure and wastewater as possible. Clean water can be added to facilitate pumping of slurry. This slurry manure shall be applied per NRCS conservation standard practice for Nutrient Management, Code 590.
- If the sludge on the bottom is deemed to pose a threat to groundwater or surface water resources, it may be left in place. If it is a threat the sludge shall be removed and land applied as a solid waste according to NRCS standards 590 (listed above), and also Waste Utilization Code 633. The sludge shall be tested for nutrients as well as heavy metals.
- After the manure wastewater and sludge is removed, the earthen impoundment may be filled in and graded to the natural slope of the land, or it may be rehabilitated or converted to a freshwater pond or other use if it meets the NRCS conservation standards for its intended purpose, Pond (Code 378), Irrigation Pit (Code 552) or Irrigation Storage Reservoir (Code 436).
- This closure/ rehabilitation plan for the waste system storage/treatment structure(s) will meet or exceed NRCS technical standards and guidelines.
- Proper maintenance of the facility per “Operations and Maintenance” procedures for the Lagoon, (see page 83) shall be continued until proper closure is completed.
- The schedule for closure will not exceed 360 days from the time that the storage structure is discontinued.

MMP Input Data from AWM for: Riverland Farms

Assisted by: ManPlan Inc

Average Annual Manure Production Stored (for MMP "Analysis" tab)

Facility	Manure		Bedding		Wash Water Gallons	Flush Water Gallons	Runoff and Extr Precip Gallons	Rainfall Gallons	Annual Throughput	
	Tons	Gallons	Tons	Gallons					Volume w/o 25Yr Rainfall and Runoff Tons	Gallons
Storage Pond #1	NA	5667682	NA	260737	914933	0	33211.2	1084525	NA	7961088.2
Dry Stack (Covered) #1	1035	NA	45.8	NA	NA	NA	NA	NA	1080.8	NA
Dry Stack (Covered) #2	357	NA	9.2	NA	NA	NA	NA	NA	366.2	NA
Annual Total	1,392	5,667,682	55	260,737	914,933	0	33,211	1,084,525	1,447	7,961,088

Spreadable or Pumpable Capacity (for MMP "Storage" tab)

Facility	Manure		Bedding		Wash Water Gallons	Flush Water Gallons	Runoff & Extrn Precip Gallons	Rainfall Gallons	Design Storage		Design Volume w/o 25Yr Rainfall and Runoff	
	Tons	Gallons	Tons	Gallons					Period Months	Tons	Gallons	
Storage Pond #1	NA	3298405	NA	151740	532461	0	39794	860686	7	NA	4883086	
Dry Stack (Covered) #1	520.1	NA	23	NA	NA	NA	NA	NA	6	543.1	NA	
Dry Stack (Covered) #2	356.8	NA	9.1	NA	NA	NA	NA	NA	12	365.9	NA	

Animal Production Data

Animal	Type of Animal	Number	Weight in Lb	Manure Produced per Animal Unit in CF/Day	Total Manure Produced in CF/Day	Annual Manure Produced in CF	Annual Manure Produced in Gal
Calf (330 lb)	Dairy	50	250	1.30	16.25	5,948	44,487
Dry Cow	Dairy	50	1300	0.84	54.60	19,984	149,477
Heifer (970 lb)	Dairy	25	1000	0.90	22.50	8,235	61,598
Milker(100lb Milk)	Dairy	380	1300	1.36	671.84	245,893	1,839,283
Milker(75lb Milk)	Dairy	270	1300	1.15	403.65	147,736	1,105,065
Totals		775	N/A	N/A	1168.84	427,795	3,199,910

Annual Production vs Storage

Manure Stored			Manure Not Captured		
(CF)	(Gal)	(Lbs)	(CF)	(Gal)	(Lbs)
804095	6014631	48245700	-376300	-2814724	-2.3E+07

Animal Waste Management Plan Report

prepared for Riverland Farms

Designed By: ManPlan Inc

Checked By:

Date: 3/21/2012

Date:

Farm Information

of Operating Periods: 1 State: TN Data Source: NRCS-2008

Operating Period: January - December

Climate Data

County: Polk

Lagoon Loadings:

Station: COPPERHILL TN2024

Rational Design Method:

25 Yr - 24 Hr Storm Event: 6.33 inches

Barth KVAL: 0

Load Rate for Odor, OCV: 0 lbs VS/cu. ft/day

LRV Max: 0.00625 lbs VS/cu. ft/day

NRCS Design Method:

Anaerobic Load Rate: 0 lbs VS/1000 cu. ft/day

Month	Prec. (in)	Evap. (in)
January	5.78	1.50
February	5.47	1.80
March	6.43	2.90
April	4.94	4.00
May	5.00	4.80
June	4.56	5.50
July	5.40	5.60
August	4.78	5.20
September	4.52	4.30
October	3.28	2.90
November	4.99	1.70
December	5.00	1.70
Total	60.15	41.90

Animal Data

Animal	Type	Quantity	Weight	Manure	VS	TS	Manure	Manure	VS	TS
					lbs	cu.ft/day/AU	lbs/day/AU	lbs/day	lbs/day	lbs/day
Calf (330 lb)	Dairy	50	250	1.30	7.70	9.20	16.25	975.0	96.25	115.00
Dry Cow	Dairy	50	1300	0.84	5.60	6.60	54.60	3276.0	364.00	429.00
Heifer (970 lb)	Dairy	25	1000	0.90	7.30	8.50	22.50	1350.0	182.50	212.50
Milker(100lb M)	Dairy	380	1300	1.36	12.00	15.00	671.84	40310.4	5928.00	7410.00
Milker(75lb Mi)	Dairy	270	1300	1.15	11.00	14.00	403.65	24219.0	3861.00	4914.00
Totals		775	N/A	N/A	N/A	N/A	1168.84	70130.4	10431.75	13080.50

Location Data

Percent of Manure Deposited in Each Location:

Period 1

calf barn		
Animal Name		
Percent Manure		
	Milker(100lb Milk)	0
	Heifer (970 lb)	0
	Dry Cow	0
	Calf (330 lb)	100
	Milker(75lb Milk)	0
Freestall barn		
Animal Name		
Percent Manure		
	Heifer (970 lb)	0
	Dry Cow	0
	Milker(100lb Milk)	100
	Milker(75lb Milk)	90
	Calf (330 lb)	0
Pack barn		
Animal Name		
Percent Manure		
	Milker(75lb Milk)	10
	Milker(100lb Milk)	0
	Heifer (970 lb)	30
	Calf (330 lb)	0
	Dry Cow	0
pasture		
Animal Name		
Percent Manure		
	Milker(100lb Milk)	0
	Calf (330 lb)	0
	Heifer (970 lb)	70
	Milker(75lb Milk)	0
	Dry Cow	100
Totals		
Animal Name		
Percent Manure		
	Milker(75lb Milk)	100
	Calf (330 lb)	100

	Dry Cow	100
	Heifer (970 lb)	100
	Milker(100lb Milk)	100

Additions Data

Waste Water VS Loading: 12.9

Operating Period: 1

Location	Wash Water	Flush Water	Bedding	Amount
	gal/day	gal/day		lbs/day
Washwater	2500.00	0.00		0.00
Freestall barn	0.00	0.00	Sand	5000.00
pasture	0.00	0.00		0.00
calf barn	0.00	0.00	Sawdust - Shavings	50.00
Pack barn	0.00	0.00	Sawdust - Shavings	250.00

Runoff Data

Runoff Volume Method: Calculate Monthly Runoff Volumes with AWM

Pervious Watershed Area: 0 acres

Pervious Curve Number Storm 90

Pervious Curve Number Monthly 90 (1 day), 77 (30 day)

Impervious Area: 1000 sq. ft

25 Year Pervious: 0.00 cu. ft

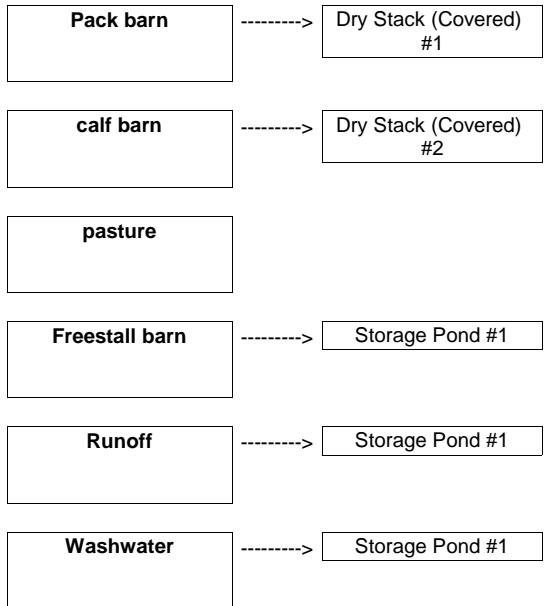
25 Year Impervious: 510.00 cu. ft

25 Year Total: 510.00 cu. ft

Runoff Volumes (1000 cu. ft.)

Month	Pervious	Impervious	Month Total
January	0.00	0.43	0.43
February	0.00	0.41	0.41
March	0.00	0.49	0.49
April	0.00	0.36	0.36
May	0.00	0.37	0.37
June	0.00	0.33	0.33
July	0.00	0.40	0.40
August	0.00	0.35	0.35
September	0.00	0.33	0.33
October	0.00	0.23	0.23
November	0.00	0.37	0.37
December	0.00	0.37	0.37
Total	0.00	4.44	4.44

Management Train



Facility Volume Data

Operating Period 1

Facility	Manure	Wash Water	Flush Water	Bedding	Total Vol
Dry Stack (Covered) #2	32.50	0.00	0.00	6.35	38.85
Dry Stack (Covered) #1	94.23	0.00	0.00	31.75	125.98
Storage Pond #1	2070.25	334.20	0.00	95.24	2499.69

Waste Facilities

Dry Stack (Covered) #1

Max. Storage Vol. Method: Cum. Storage Vol

Storage Months: 6 months

Critical Months: Oct - Apr

Design Dimensions

Shape: Rectangle

Top Length: 508.3 ft

25Yr24Hr Storm Depth:

Sideslope:

Bottom Length: 508.3 ft

Prec Minus Evap Depth:

Storage Depth: 1.2 ft

Top Width: 38.0 ft

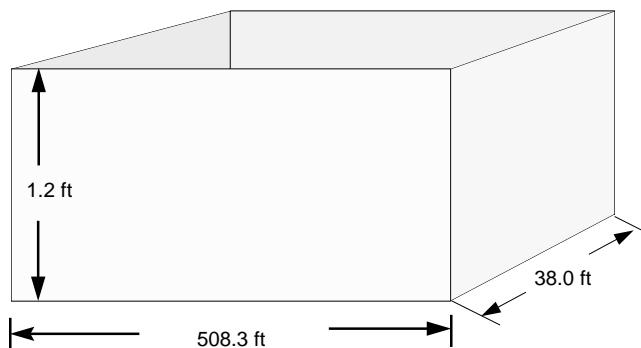
Volume Required (Wastes): 23180 cu. ft

Freeboard: 0.0 ft

Bottom Width: 38.0 ft

Bot Dimensions 38.0 x 508.3 ft
TopDimensions: 38.0 x 508.3 ft

Design Quantities



Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	0	<input type="checkbox"/>	3.91	6.89	0.00	11.59
February	0	<input type="checkbox"/>	3.65	5.91	0.00	15.24
March	0	<input type="checkbox"/>	3.91	5.68	0.00	19.15
April	0	<input checked="" type="checkbox"/>	3.78	1.51	0.00	22.93
May	0	<input type="checkbox"/>	3.91	0.32	0.00	3.91
June	0	<input type="checkbox"/>	3.78	-1.51	0.00	7.68
July	0	<input type="checkbox"/>	3.91	-0.32	0.00	11.59
August	0	<input type="checkbox"/>	3.91	-0.68	0.00	15.50
September	0	<input type="checkbox"/>	3.78	0.35	0.00	19.27
October	0	<input checked="" type="checkbox"/>	3.91	0.61	0.00	23.18
November	0	<input type="checkbox"/>	3.78	5.30	0.00	3.78
December	0	<input type="checkbox"/>	3.91	5.31	0.00	7.68

Dry Stack (Covered) #2

Max. Storage Vol. Method: Cum. Storage Vol

Storage Months: 12 months

Critical Months: Oct - Apr

Design Dimensions

Shape: Rectangle

Top Length: 284.4 ft

Design Quantities

Sideslope:

Bottom Length: 284.4 ft

25Yr24Hr Storm Depth:

Storage Depth: 2.0 ft

Top Width: 25.0 ft

Prec Minus Evap Depth:

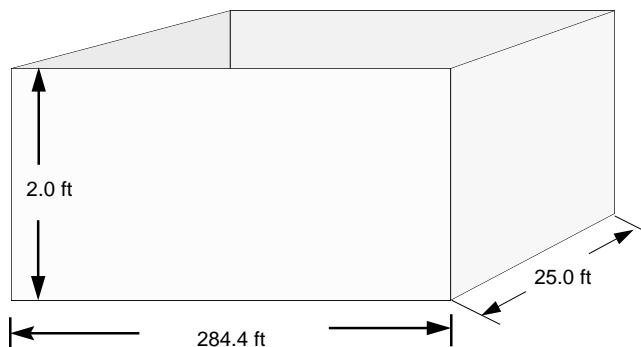
Freeboard: 0.0 ft

Bottom Width: 25.0 ft

Volume Required (Wastes): 14219 cu. ft

Bot Dimensions 25.0 x 284.4 ft

TopDimensions: 25.0 x 284.4 ft



Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	0	<input type="checkbox"/>	1.20	2.54	0.00	10.72
February	0	<input type="checkbox"/>	1.13	2.17	0.00	11.85
March	0	<input type="checkbox"/>	1.20	2.09	0.00	13.05
April	0	<input checked="" type="checkbox"/>	1.17	0.56	0.00	14.22
May	0	<input type="checkbox"/>	1.20	0.12	0.00	1.20
June	0	<input type="checkbox"/>	1.17	-0.56	0.00	2.37
July	0	<input type="checkbox"/>	1.20	-0.12	0.00	3.57
August	0	<input type="checkbox"/>	1.20	-0.25	0.00	4.78
September	0	<input type="checkbox"/>	1.17	0.13	0.00	5.94
October	0	<input type="checkbox"/>	1.20	0.23	0.00	7.15
November	0	<input type="checkbox"/>	1.17	1.95	0.00	8.31
December	0	<input type="checkbox"/>	1.20	1.96	0.00	9.52

Storage Pond #1

Max. Storage Vol. Method: Cum. Storage Vol

Storage Months: 7 months

Critical Months: Oct - Apr

Design Dimensions

Shape: Rectangle

Top Length: 300.0 ft

25Yr24Hr Storm Depth: 6.3 in

Sideslope: 2:1

Bottom Length: 224.0 ft

Prec Minus Evap Depth: 2.02 ft

Storage Depth: 18.0 ft;

Top Width: 190.0 ft

Volume Required (Wastes): 535094 cu. ft

Freeboard: 1.0 ft

Bottom Width: 114.0 ft

Permanent Additional Storage

Bot Dimensions

Soil Liner

TopDimensions: 190.0 x 300.0 ft

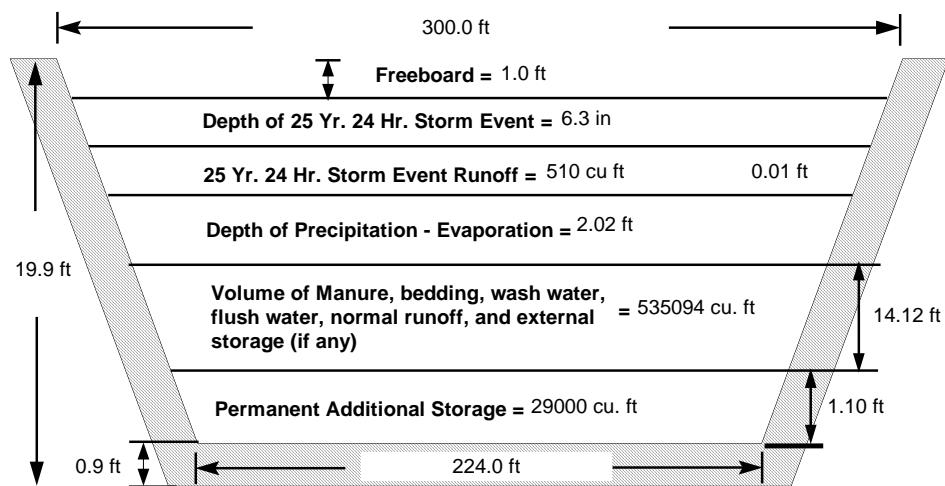
Liner Depth: 0.9 ft

Permeability: .0001 ft/day

Liquid Depth: 16.8 ft
4

Specific Discharge: .002 ft³/ft²/day

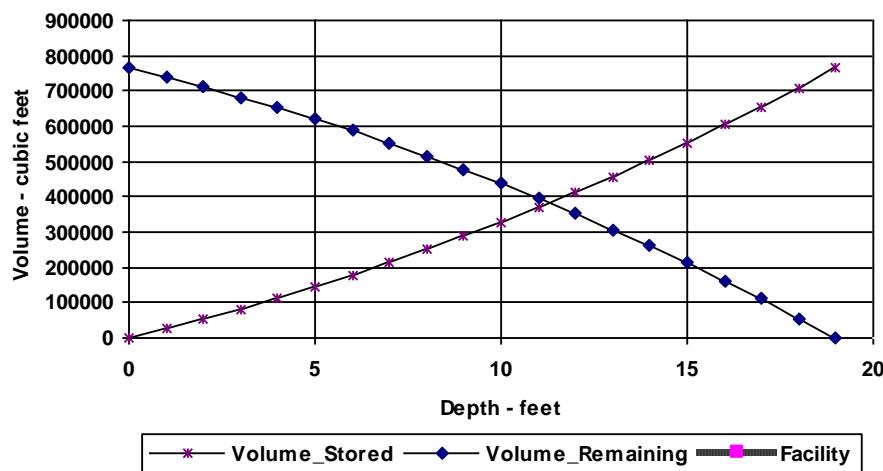
Design Quantities



Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	0.43	□	77.49	22.42	0.00	373.15
February	0.41	□	72.49	19.94	0.00	465.99
March	0.49	□	77.49	20.80	0.00	564.78
April	0.36	✓	74.99	10.03	0.00	650.16
May	0.37	□	77.49	7.63	0.00	85.49
June	0.33	□	74.99	3.19	0.00	164.00
July	0.40	□	77.49	6.84	0.00	248.74
August	0.35	□	77.49	5.24	0.00	331.82
September	0.33	✓	74.99	7.03	0.00	414.17
October	0.23	□	77.49	5.84	0.00	83.56
November	0.37	□	74.99	17.99	0.00	176.92
December	0.37	□	77.49	18.04	0.00	272.82

Stage Storage Curve

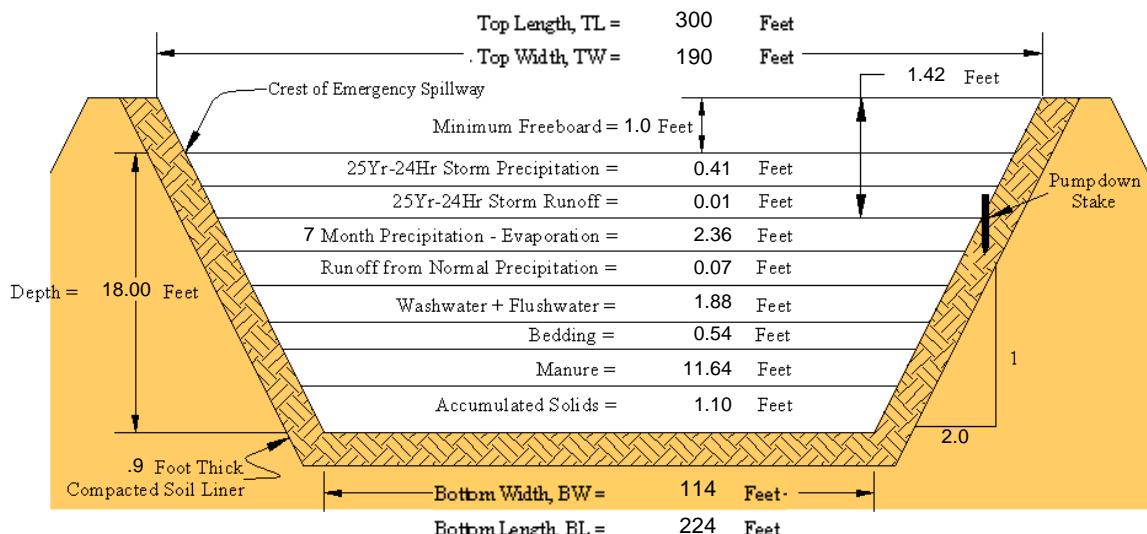


AWM

Waste Storage Pond Data for: Riverland Farms

Designed by: ManPlan Inc

<i>Facility</i>	Rectangular Storage Pond #1	
<i>Storage Period</i>	7 Months	
<i>Manure & External Effluent</i>	440,963 <i>Cubic Feet</i>	3,298,403 <i>Gallons</i>
<i>Bedding</i>	20,286 <i>Cubic Feet</i>	151,739 <i>Gallons</i>
<i>Flush Water</i>	0 <i>Cubic Feet</i>	0 <i>Gallons</i>
<i>Wash Water</i>	71,185 <i>Cubic Feet</i>	532,464 <i>Gallons</i>
<i>Runoff from Drainage Area</i>		
25Yr-24Hr Storm	510 <i>Cubic Feet</i>	3,815 <i>Gallons</i>
Normal Rainfall	2,660 <i>Cubic Feet</i>	19,897 <i>Gallons</i>
<i>Rainfall on Pond Surface</i>		
25Yr-24Hr Storm	29,925 <i>Cubic Feet</i>	223,839 <i>Gallons</i>
Normal Rainfall minus Evaporation	115,065 <i>Cubic Feet</i>	860,686 <i>Gallons</i>
<i>Accumulated Solids</i>	29,000 <i>Cubic Feet</i>	216,920 <i>Gallons</i>
<i>Design Operating Volume</i> ..	650,159 <i>Cubic Feet</i>	4,863,189 <i>Gallons</i>
<i>Total Storage Volume</i>	680,594 <i>Cubic Feet</i>	5,090,843 <i>Gallons</i>
<i>Ramp Volume (if applicable)</i>	0 <i>Cubic Feet</i>	
<i>Structural Volume (includes effects of ramp if present)</i>	765,801 <i>Cubic Feet</i>	



OPERATION AND MAINTENANCE GUIDELINES for Storage Pond #1

Landowner: Riverland Farms

Designed by: ManPlan Inc

Manure storage ponds are designed to contain all of the manure, bedding, and water that is generated by the site. Care should be exercised so that foreign objects or frozen material are excluded from the facility. It is wise to dedicate a portion of the feedlot as a place to stack frozen materials until they thaw and can be added to the facility.

Excessive bedding can also cause management problems with a holding pond. Granular materials such as limestone and sand will settle to the bottom and can cause problems with agitation processes and with equipment.

Manure storage ponds experience some biological activity and can generate undesirable odors. This can be minimized if a crust forms on the surface. Some crusts form naturally and others can be encouraged by blowing chopped straw or bedding on the surface.

Adequate time needs to be allocated for emptying the storage pond. A marking post should be placed in the pond indicating that one half of the volume has been used when the facility contains 11.2 feet of material and three fourths of the capacity has been used when there is 15.7 feet in the facility.

This structure has been sized for 7 months of storage and will contain up to 5728193 gallons of material. Prior to emptying the manure storage pond, it should be initially agitated for at least 1 day. Additional agitation may be needed during the emptying process.

To empty the waste storage pond using a 7200 gallon tank spreader, approximately 795 loads will be required. Assuming 2 loads per hour, over 397 hours would be required to empty the storage pond.

Using irrigation equipment pumping 600 gallon per minute, emptying the waste storage pond would require approximately 159 hours of pumping time each time. (not including agitation or moving of equipment)

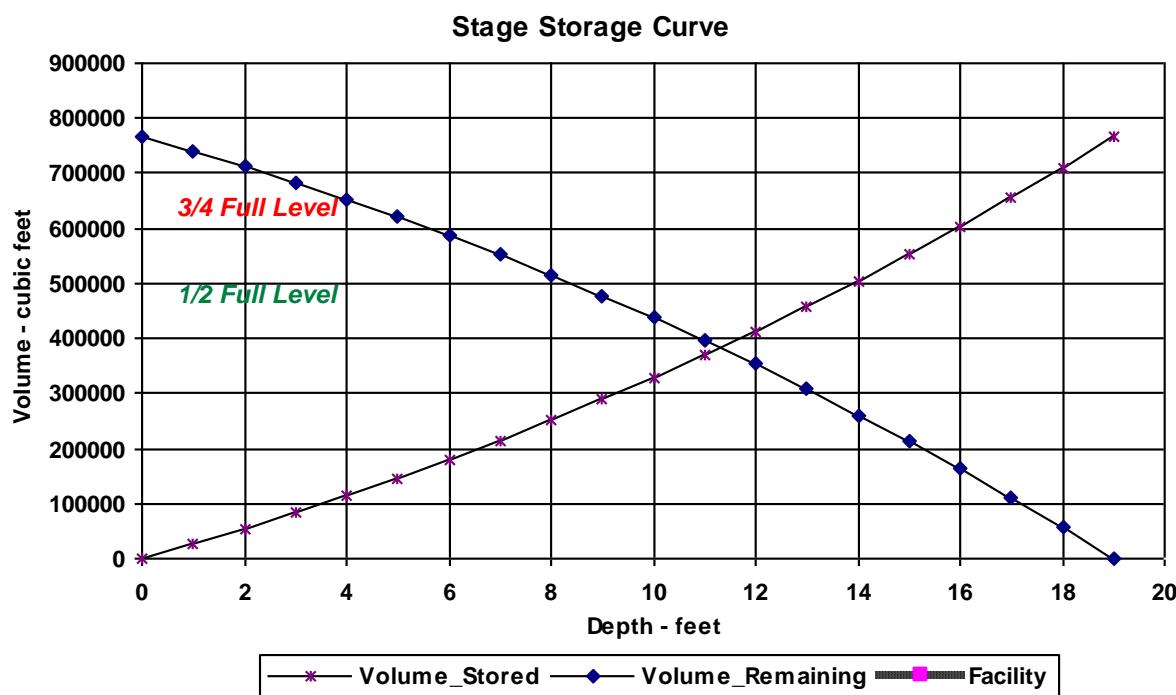
OPERATION AND MAINTENANCE GUIDELINES for Storage Pond #1

Landowner: Riverland Farms

Designed by: ManPlan Inc

Ground conditions need to be evaluated prior to applying the waste. Excessively wet conditions or excessively dry conditions should be avoided, since waste may either run off or flow thru cracks to subsurface drainage systems. Wind conditions should be observed to avoid drift and odor problems. Subsurface outlets and downstream drainage should be constantly monitored.

Maximum application rates should consider the intake capability of the particular soils that the waste is applied on. When irrigating, a maximum application rate of 1 inches is recommended for most soils. Please check your Comprehensive Nutrient Management Plan (CNMP) for application rates and dates.



AWM

Solids Stacking Facility Data for: Riverland Farms

Designed by: ManPlan Inc

Facility Dry Stack (Covered) #1

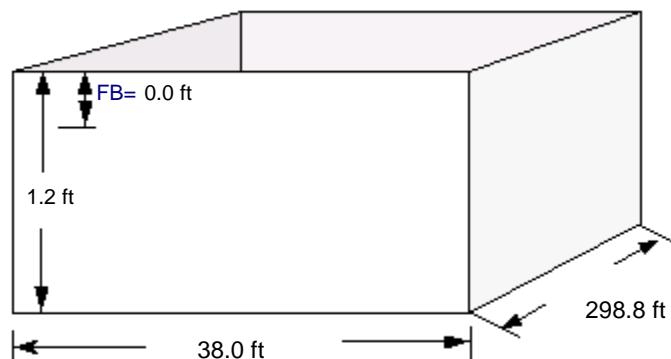
Storage Period 6 Months

Manure 10,930 Cubic Feet

Bedding 2,920 Cubic Feet

Total Volume to Store 13,850 Cubic Feet

Total Volume of Facility 13,625 Cubic Feet



AWM

Solids Stacking Facility Data for: Riverland Farms

Designed by: ManPlan Inc

Facility Dry Stack (Covered) #2

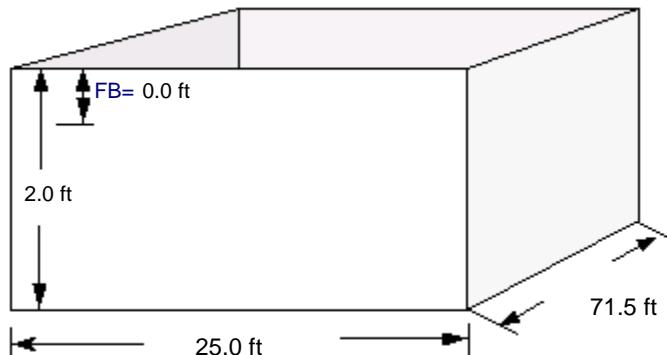
Storage Period 6 Months

Manure 2,991 Cubic Feet

Bedding 583 Cubic Feet

Total Volume to Store 3,574 Cubic Feet

Total Volume of Facility 3,575 Cubic Feet



OPERATION AND MAINTENANCE GUIDELINES

for

Dry Stack (Covered) #1

Landowner: Riverland Farms

Designed by: ManPlan Inc

This solids storage facility will store up to 13850 cubic feet of solid manure and bedding. The liquid portion of the material (including wash water and lot runoff) will have to be handled in a liquid storage facility or vegetative treatment area. Typically, periodic scraping of manure is required to move the material into the storage facility. Bedding, or similar material, may need to be added to the manure in order for it to stack to the design height of 1 feet.

To allow time for land applying the material, consider the following. This structure is sized for 6 months storage. If the facility was emptied and land applied using a 350 cu. ft. spreader, it would take approximately 39.6 loads. Assuming 2 loads per hour, a total of 19.8 hours may be required.

Ground conditions must be evaluated prior to spreading. Irreversible compaction problems and damage to underground drainage systems may result from the excessive weight of a loaded spreader. Caution should be exercised to insure that the material does not run or wash off from the land. Consult your Comprehensive Nutrient Management Plan (CNMP) for application rates and dates.

OPERATION AND MAINTENANCE GUIDELINES

for

Dry Stack (Covered) #2

Landowner: Riverland Farms

Designed by: ManPlan Inc

This solids storage facility will store up to 3574 cubic feet of solid manure and bedding. The liquid portion of the material (including wash water and lot runoff) will have to be handled in a liquid storage facility or vegetative treatment area. Typically, periodic scraping of manure is required to move the material into the storage facility. Bedding, or similar material, may need to be added to the manure in order for it to stack to the design height of 2 feet.

To allow time for land applying the material, consider the following. This structure is sized for 6 months storage. If the facility was emptied and land applied using a 350 cu. ft. spreader, it would take approximately 10.2 loads. Assuming 2 loads per hour, a total of 5.1 hours may be required.

Ground conditions must be evaluated prior to spreading. Irreversible compaction problems and damage to underground drainage systems may result from the excessive weight of a loaded spreader. Caution should be exercised to insure that the material does not run or wash off from the land. Consult your Comprehensive Nutrient Management Plan (CNMP) for application rates and dates.

Suitable Burial site west of pack barn, (marked in yellow outline).



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map center: 35.209818, -84.680452

scale: 2226



Maps provided by:



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Polk County
Tennessee



6/3/2012

Section 3. Farmstead Safety and Security

3.1. Emergency Response Plan

In Case of an Emergency Storage Facility Spill, Leak or Failure

Implement the following first containment steps:

- a. Stop all other activities to address the spill.
- b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
- c. Call for help and excavator if needed.
- d. Complete the clean-up and repair the necessary components.
- e. Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application

Implement the following first containment steps:

- a. Stop all other activities to address the spill and stop the flow.
- b. Call for help if needed.
- c. If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
- d. Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
- e. If flow is coming from a tile, plug the tile with a tile plug immediately.
- f. Assess the extent of the emergency and request additional help if needed.

Farm Information

Farm Name	Riverland Dairy Farm	
Address	Farm Address: 4660 Upper River Road Charleston, TN 37310 Mailing address: 4660 Upper River Road Charleston, TN 37310	
Farm Phone	Rex Calfee: cell: 423-715-0391 office: 423-338-0008	
Permit #	Applied for	
Directions to Farm	A  Charleston, TN 1. Head southeast on Cass St toward Broadway St NE go 466 ft total 466 ft 2. Take the 1st right onto Broadway St NE About 1 min go 0.2 mi total 0.3 mi 3. Turn left onto Wool St NE go 0.2 mi total 0.5 mi 4. Take the 2nd right onto Railroad St About 1 min go 0.2 mi total 0.7 mi 5. Continue onto Chatata Valley Rd NE About 3 mins go 1.0 mi total 1.7 mi 6. Turn left onto Upper River Rd NE About 18 mins go 7.2 mi total 8.8 mi B  Upper River Rd	

Emergency Contacts

	Name	Emergency Phone
Farm Owner	Rex Calfee	423-338-0008 Cell: 423 715-0391
Farm Manager		
Polk County Sheriffs Office	Bill Davis	911 423-338-8215
Fire Department	Cleveland Fire Department Chatata Valley VOL F.D.	911 423-559-3340 423-336-2737
Ambulance	Rural Metro Inc., Cleveland	911 423-338-4457
Excavation Equipment: Backhoe, Dozer	Hooper & Son Excavation	423-780-9290

Agency Contacts

Contact Agency	Person	Day Phone	Emergency Number
TWRA - Tenn. Wildlife Resources Agency			(800) 890 TENN or (800) 890-8366
TDEC-Environmental Assistance Center	Dick Urban	423-634-5702	(888) 891-8332
Polk County Sheriffs Office	Bill Davis	423-338-8215	911
State Veterinarian: (If mortality issues)	Dr. Charles Hatcher Nashville, TN	(615) 837-5120	
UT Extension, Benton, TN		423-338-4503	

Be prepared to provide the following information to emergency response agency:

- a. Your name and contact information.
- b. Farm location (driving directions) and other pertinent information.
- c. Description of emergency.
- d. Estimate of the amounts, area covered, and distance traveled.
- e. Whether manure has reached surface waters or major field drains.
- f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
- g. Current status of containment efforts.

3.2. Biosecurity Measures

Biosecurity is critical to protecting livestock and poultry operations. Visitors must contact and check in with the producer before entering the operation or any production or storage facility.



BIOSECURITY FOR DAIRY FARMS

Introduction

Outbreaks of infectious disease have shown that it pays to be conscientious about preventing and controlling infectious disease on livestock operations. This concept is known as biosecurity. Biosecurity refers to management practices that reduce the chances infectious diseases will be carried onto the farm by animals or people. Biosecurity also reduces the spread of infectious disease on farms.

Animal + infectious agent + environment = disease

All infectious diseases result from the interplay between the animal and its ability to resist disease (its immunity), an infectious agent (bacteria, viruses and parasites) and the environment. For example, producers can prevent some diseases by using vaccination to increase immunity. Producers can also prevent disease by keeping infectious agents from coming onto their farm. If an infectious agent is already on the farm, producers can try to eradicate it or control its spread.

Strategic vaccination

Vaccination is an essential component of disease prevention. Setting up a well planned strategic vaccination program means determining what diseases to vaccinate against, identifying who will most benefit from vaccination and finding out when they will most need the protection that vaccines provide. For more details on planning a vaccination program, please contact your herd veterinarian.

Preventing the introduction and spread of infectious diseases

Note: Every animal that dies unexpectedly on your farm should be examined by your herd veterinarian to determine the cause of death.

1. Keeping a closed herd

Keeping a closed herd is one way to protect cattle from infectious disease. In a closed herd, no cattle enter the farm either by purchase or loan and resident cattle do not make contact with any cattle from other farms. A herd is **not** closed if

- Cattle are purchased or boarded;
- Cattle return to the herd after going to shows, community pastures or performance evaluation centers;
- Cattle use a pasture that shares a fence line with cattle in pasture on a different farm;
- Bulls are purchased, borrowed or loaned; and
- Cattle from the herd are transported by someone else or in someone else's vehicle

2. Purchasing new cattle

It is important to plan the introduction of animals to minimize the risk that an infectious disease will be brought in at the same time. Three factors are important in reducing the risk of infectious diseases when purchasing new cattle.

- The protection you have given your herd by proper vaccination
- The source of purchased cattle, including how they are transported to the farm
- The method you will use to actually introduce the new cattle to the rest of the herd

3. Resident cattle

Make certain your own cattle are properly vaccinated according to the manufacturer's and your herd veterinarian's recommendations before bringing new cattle into the herd.

4. The source of purchased cattle

- Bring in only animals from herds where you know the health status.
- Bring in only animals from herds with a known effective vaccination program. Get specific information about the vaccination history such as when vaccine was used and when it was given. If killed vaccines were used, make sure that a primary series (two doses given a few weeks apart) was given.
- Avoid purchasing animals from unknown sources or that have been mixed with other cattle
- Buy heifers when purchasing a group of cattle. Because they aren't milking, heifers are easier to quarantine.
- Ask for health information about purchased cattle. Ask for the DHIA somatic cell count information on milking cows. Test the bulk tank for contagious mastitis.
- Transport animals in a vehicle that has been cleaned and disinfected before pick up.

5. Introducing new arrivals

- Quarantine new animals for 30 days before allowing contact with animals on-farm.
- Designate your quarantine area. It should be separated from other cattle on your farm. To prevent the spread of respiratory diseases, quarantined cattle should not share the same airspace with resident cattle.
- Quarantined cattle should not share feeders, waterers or equipment with resident cattle.
- Use a medicated foot bath before allowing purchased cattle to enter the herd.
- Prevent the spread of contagious mastitis by milking the new animals last. Sanitize the milking equipment after milking new cattle.
- Check the new animal's temperature every day or at least every other day during the quarantine period. If it develops a fever, have it checked out by your veterinarian.
- Vaccinate cattle while they are in quarantine.
-

6. Test all purchased cattle for infection with

- BVD virus
- Johne's disease
- Mastitis caused by *Staphylococcus aureus*, *Streptococcus agalactiae* and *Mycoplasma bovis*
- Bovine leukosis (optional)

It can take 1-2 weeks to get test results so collect and submit the samples as soon as the animal arrives.

7. Controlling farm traffic

Infectious diseases can be carried by people and equipment too. If you borrow equipment from other farms, make sure it has been cleaned before using it on your farm. Producers should limit access on the farm to calves and fresh cows since they are most susceptible to infectious disease.

Some steps to reduce the risk of introducing infectious diseases:

- Limit people's access to the barn. This may mean locking the door to the barn.
- Post a warning sign asking visitors to keep out. It helps to provide information on who to contact or a telephone number to call instead of entering the barn.
- Make sure visitors wear clean boots and clothing in the barn. This is important if visitors have already been in other barns. Provide some large size coveralls and boots in the barn for visitors to wear. Disposable plastic boots can be used but they wear out quickly.
- Make sure visitors use a foot bath and clean their boots with a brush and disinfectant **before** entering your barn.
- Have bull calves and other sale animals picked up without allowing the dealer or transporter to enter the barn.
- Have dead animals picked up without allowing the livestock renderer to enter your barn or come in contact with your animals.
- Keep a record of visitors.
- Use your own halters and ropes.

It is difficult to control all traffic on the farm but you can identify the traffic that represents the most risk. These include people who frequently visit other farms and people who have already visited other farms on the day they visit your farm.

Major infectious diseases of cattle in Wisconsin and their primary means of spread

Disease	Major means of spread
Bovine viral diarrhea (BVD)	Direct contact with infected cattle or their body fluids
Contagious mastitis (<i>Staph aureus</i> , <i>Strept. Agalactiae</i>)	Contact with infected milk, usually at milking
<i>Mycoplasma bovis</i>	Contact with respiratory carrier or infected milk
Bovine leukosis virus	Contact with blood of infected cattle
IBR, BRSV and PI ₃ viruses	Spread through the air
E. coli, rotavirus and coronavirus	Contact with manure from infected cattle
Salmonellosis	Contact with manure from infected cattle
Leptospirosis	Contact with urine from infected carrier cattle
Hairy heel warts	Contact with environment of infected cows
Johne's disease	Contact with manure from infected cattle

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3.3. Catastrophic Mortality Management

Refer to NRCS standards, or state guidance, regarding appropriate catastrophic animal mortality handling methods.

Plan for Catastrophic Animal Mortality Handling

The following table describes how you plan to manage catastrophic loss of animals in a manner that protects surface and ground water quality. You must follow all national, state and local laws, regulations and guidelines that protect soil, water, air, plants, animals and human health.

A Rendering Service will be called as first choice to manage large quantities of mortalities.

Closest rendering company is: Griffen Industries LLC
2905 Long Street,
Chattanooga, TN 37409
Phone 423 266 6504

If a rendering truck is not available, composting or burial will be used as alternative methods.

Composting: Temporary composting may be allowed under direction of the State Veterinarian's office. A site must be chosen with impermeable surface to prevent leaching into groundwater. Sides of the compost bins may be temporarily made of round bales of hay or stalks. Sufficient composting material must be used. Finished compost must be spread at agronomic rates. Up to 50% of the compost may be mixed back into the composter to be reused as carbon source.

(See Tennessee Emergency Disposal of Dead Animals in this section.)

Important! In the event of catastrophic animal mortality, contact the following authority before beginning carcass disposal:

Authority name: State Veterinarian of Tennessee
Contact name: Dr. Charles Hatcher
Phone number: 615 837-5120

3.4. Fuels & Chemical Handling

Gasoline and diesel fuel is stored on site in above-ground storage tanks located northwest of the dairy barn. These tanks are inspected frequently. No leaks were observed. Detergents and disinfectants are stored in the tank room south of the dairy barn to be used for power washing and cleanup of the milking equipment. Roundup herbicide and other weed control chemicals are stored in the machine shed and used for maintaining fence lines and pastures as needed.

No other hazardous chemicals are stored at this location.

Fuel handling:

Small spills during fuel transfer are bound to occur from time to time. Petroleum fuel evaporates rapidly at the land surface; however fuel readily seeps into the soil. Local geology and soil type determines how quickly fuel may reach groundwater supplies. Once in the groundwater environment, fuel is relatively stable, making it difficult to clean up. Even small spills or leaks in the same place over time are a potential threat to water resources. To reduce potential leaks and spills during fuel transfer:

- Always supervise fuel transfer from storage to equipment to prevent spillover.
- Use a can to catch any drops that may follow after shutting off the fuel nozzle.
- Replace a leaking or defective nozzle promptly.
- Enforce a "no smoking" rule at the fuel handling and storage facility.
- Keep fuel pumps and nozzles secure from children or vandalism.
- Label each pump or nozzle as to the type of fuel dispensed.

Above-ground Storage Tanks (ASTs) provide easy access and greater opportunity to observe and monitor tanks that may be leaking as compared to underground tanks. However, placement of tanks above the ground requires that tanks be protected from impact by farm equipment and personal vehicles. Spending some time on the proper placement of a new tank or implementing safety procedures to an existing tank can greatly reduce any risks associated with an AST.

Following are specific points that should be addressed when conducting an assessment of your ASTs.

- Comply with state-local rules for electrical safety and fire prevention. Keep a fire extinguisher in close proximity (e.g. within 75 feet) of ASTs.
- AST's should be located at least 50 feet from any building or combustible storage.
- Properly label tank contents, describe the health and physical hazards of the product.
- Secure against vandalism and tampering.
- If top-opening only, place on a stable base of timbers, blocks, concrete, etc. ASTs should not be in contact with bare soil.
- Display a "No Smoking" sign.
- Guard tank against impact. Choose a site where farm vehicles can easily maneuver for fueling.
- Enclose wiring in a conduit.
- Locate ASTs where soil strength is adequate to hold the weight of a full storage tank (or tanks).

CHEMICALS: For hazardous chemicals that may be stored on this site in the future, the following guidelines should be implemented.

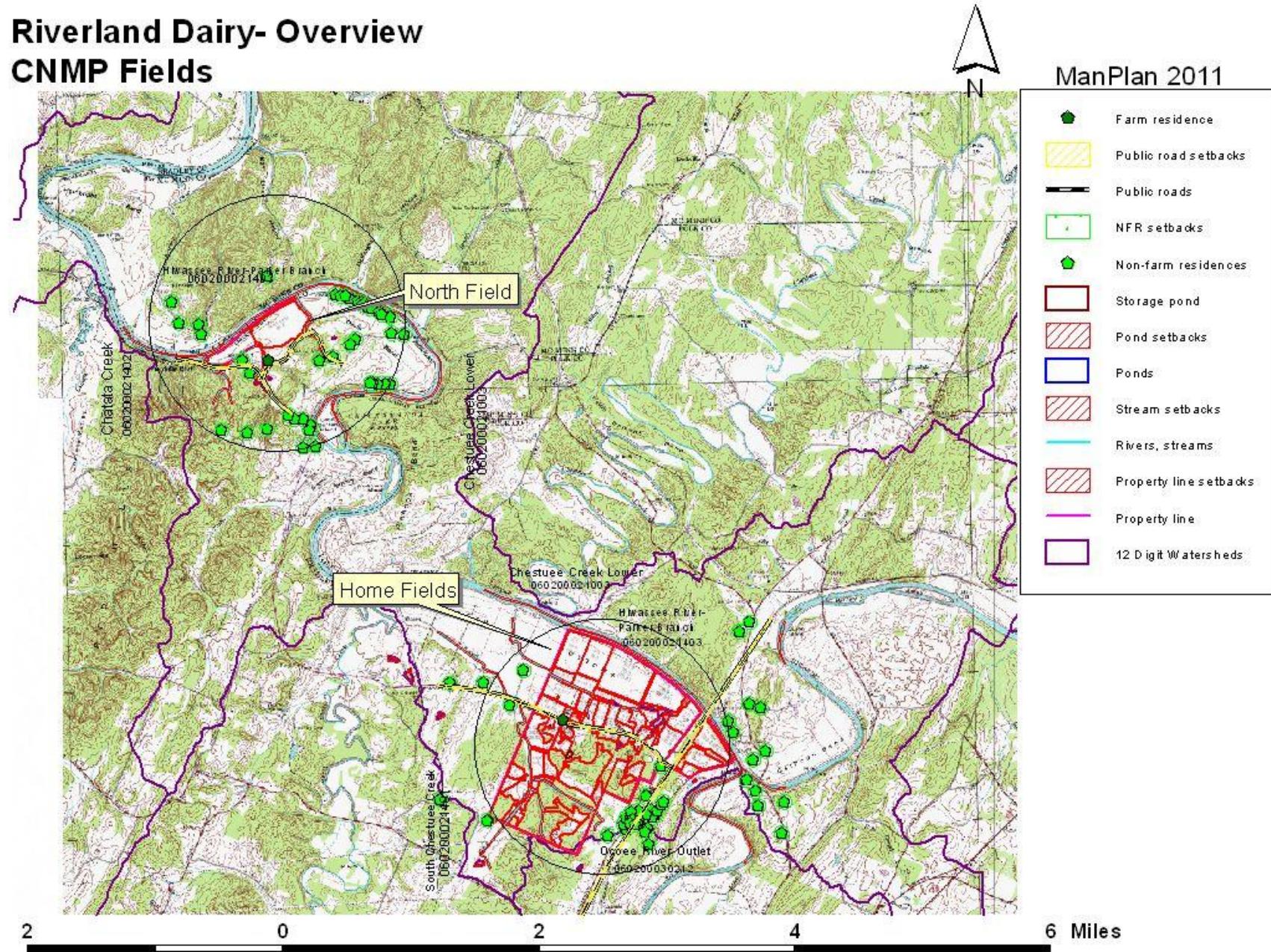
	<i>Measure</i>
X	All chemicals are stored in proper containers. Expired chemicals and empty containers are properly disposed of in accordance with state and federal regulations. Pesticides and associated refuse are disposed of in accordance with the FIFRA label.
X	Chemical storage areas are self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
X	Chemical storage areas are covered to prevent chemical contact with rain or snow.
X	Emergency procedures and equipment are in place to contain and clean up chemical spills.
X	Chemical handling and equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.
X	Many of the farm chemicals are custom applied and not stored at the operation. Equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.

Section 4. Land Treatment

4.1. Map(s) of Fields and Conservation Practices

Riverland Dairy- Overview

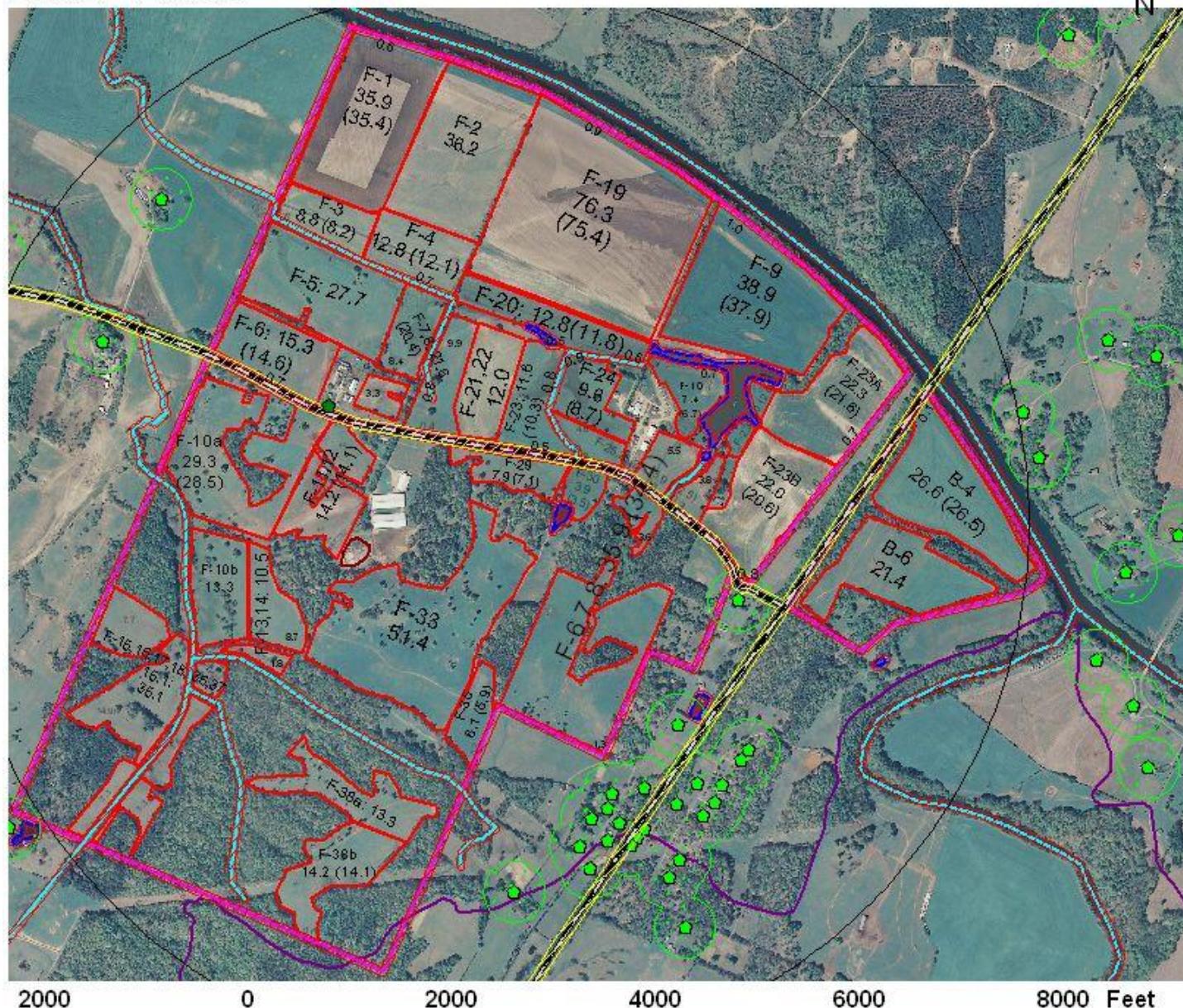
CNMP Fields



Riverland Dairy CNMP Fields



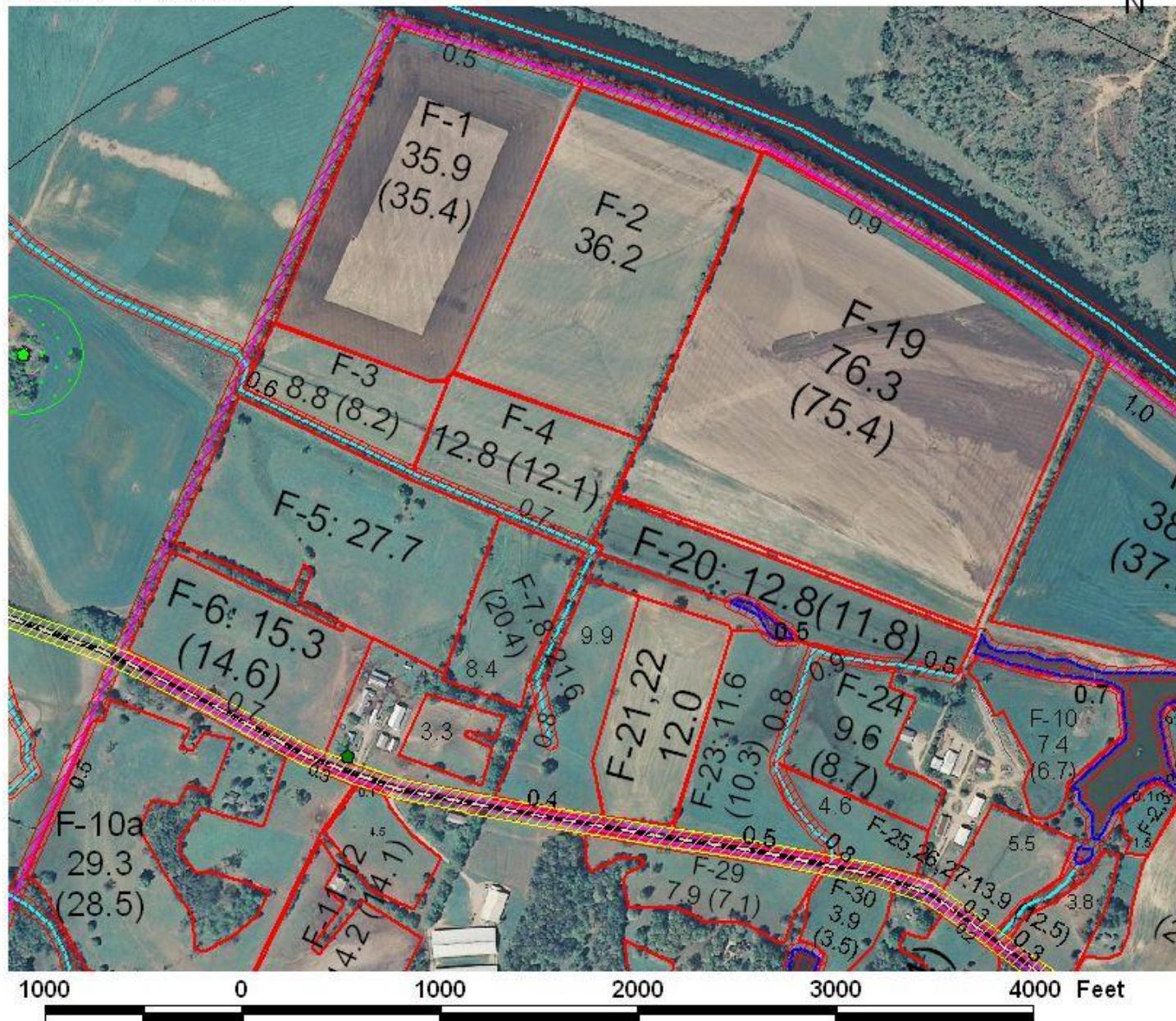
ManPlan 2011



Riverland Dairy CNMP Fields



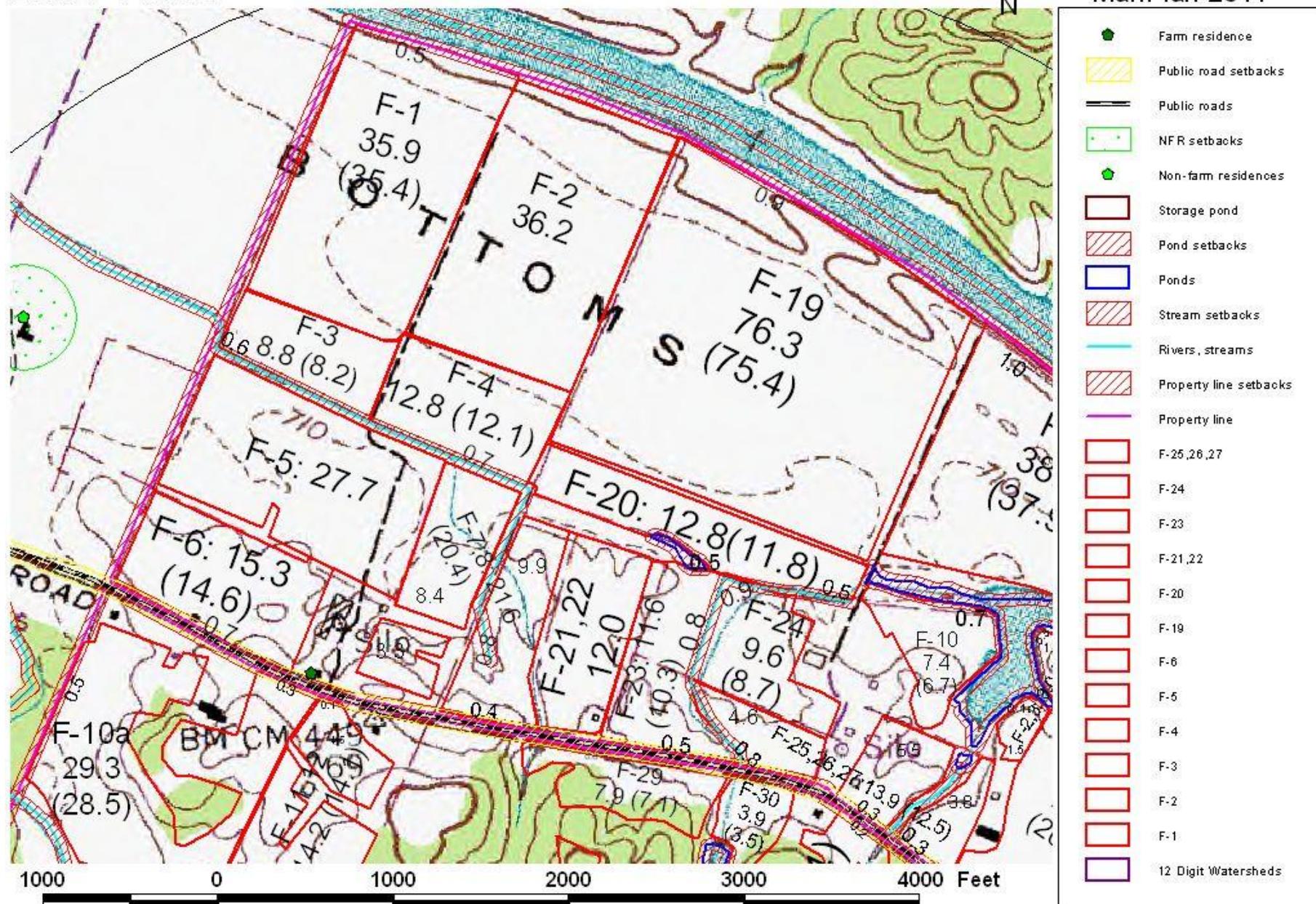
ManPlan 2011



Riverland Dairy CNMP Fields



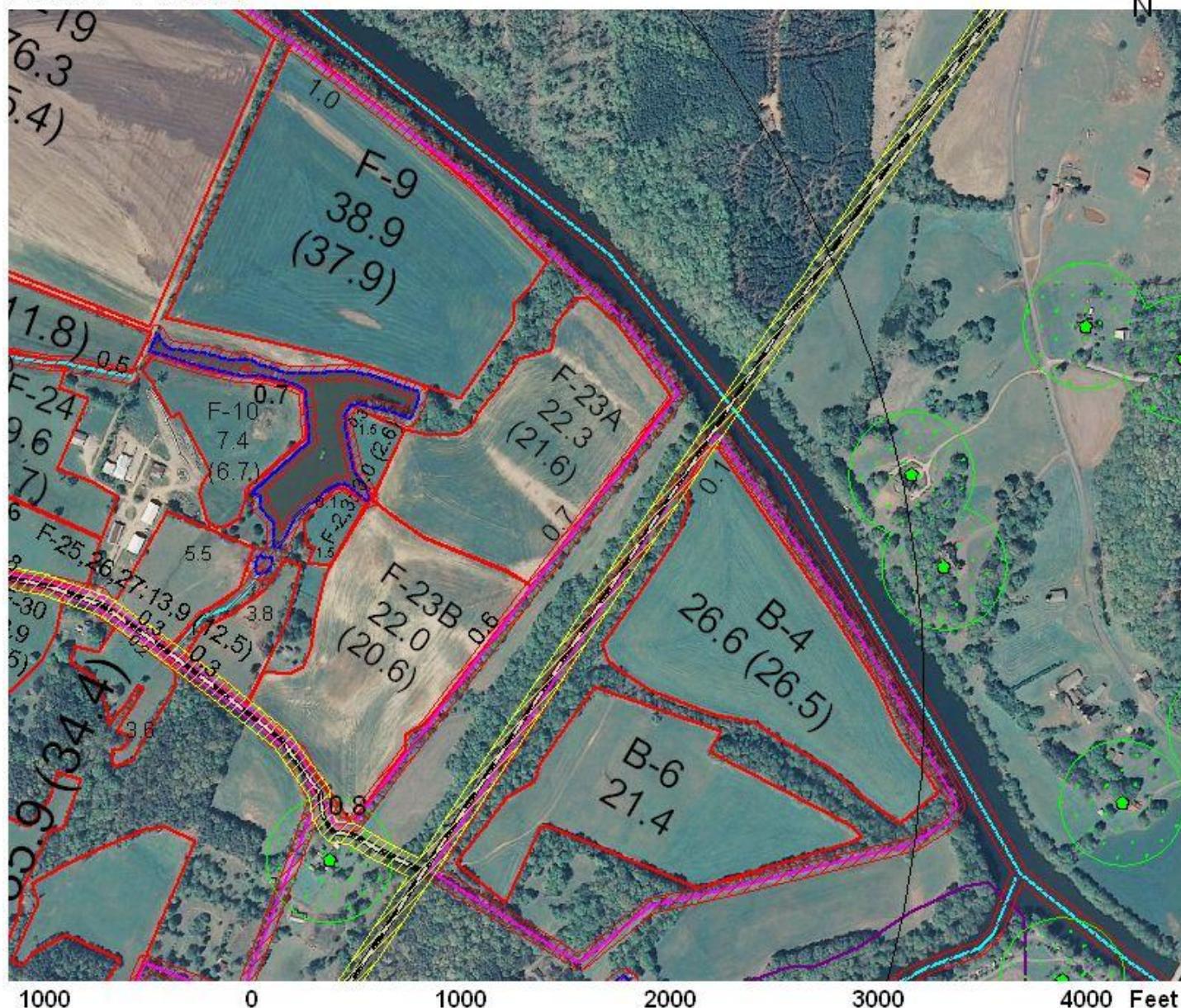
ManPlan 2011



Riverland Dairy CNMP Fields



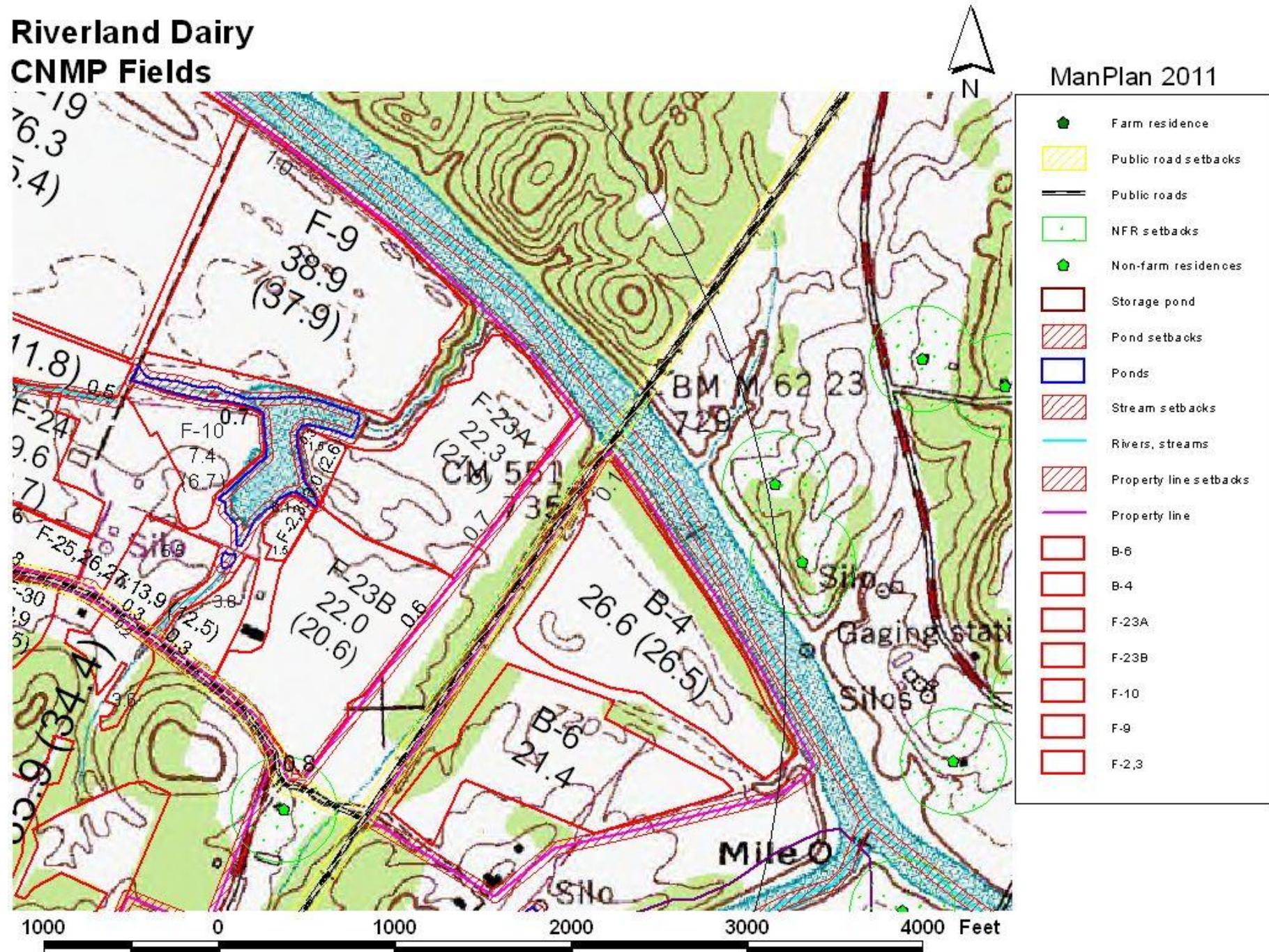
ManPlan 2011



■	Farm residence
▨	Public road setbacks
▬	Public roads
▢	NFR setbacks
●	Non-farm residences
■	Storage pond
▨	Pond setbacks
▬	Ponds
▨	Stream setbacks
▬	Rivers, streams
▨	Property line setbacks
▬	Property line
■	B-6
■	B-4
■	F-23A
■	F-23B
■	F-10
■	F-9
■	F-2,3

Riverland Dairy

CNMP Fields

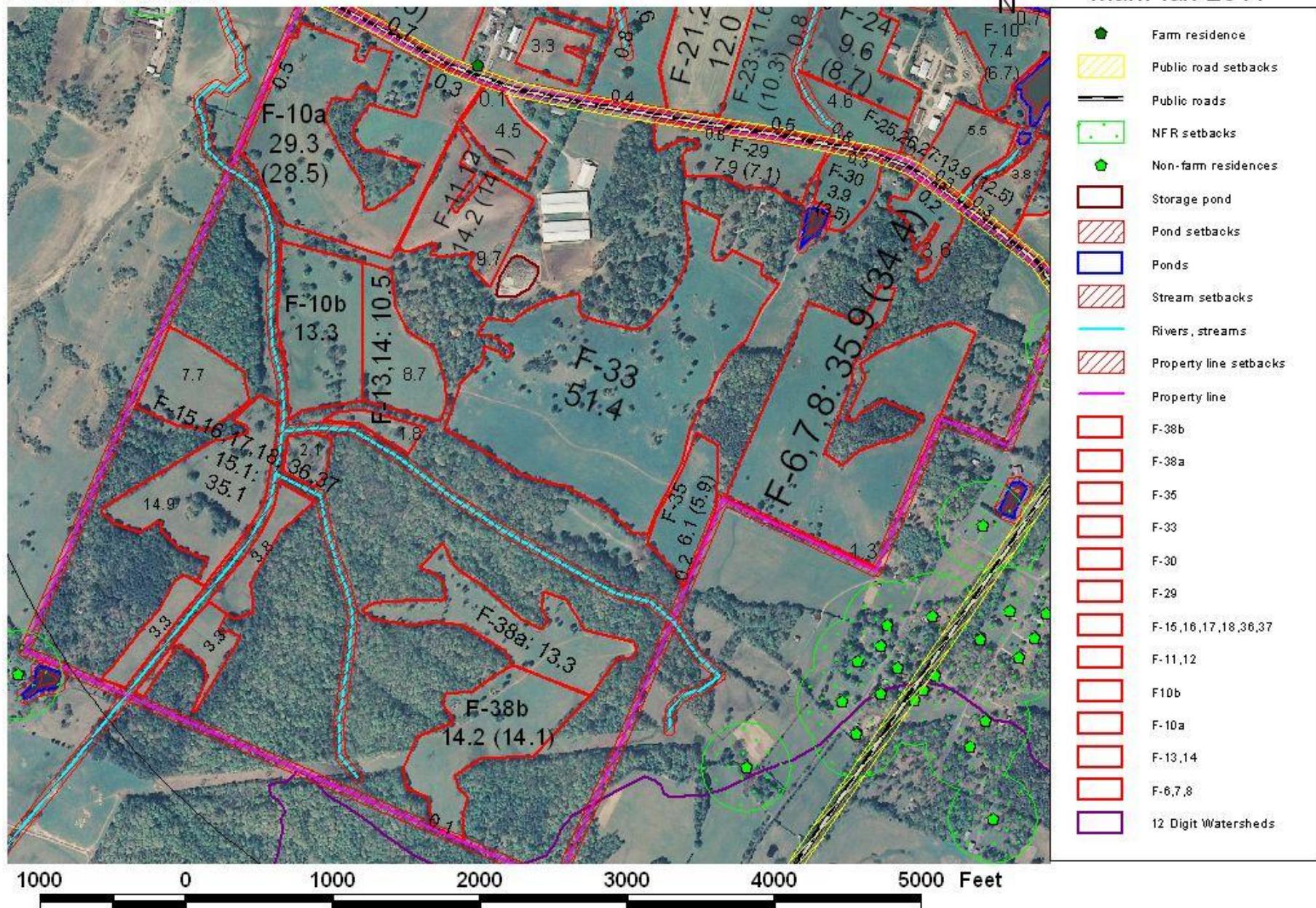


Riverland Dairy

CNMP Fields

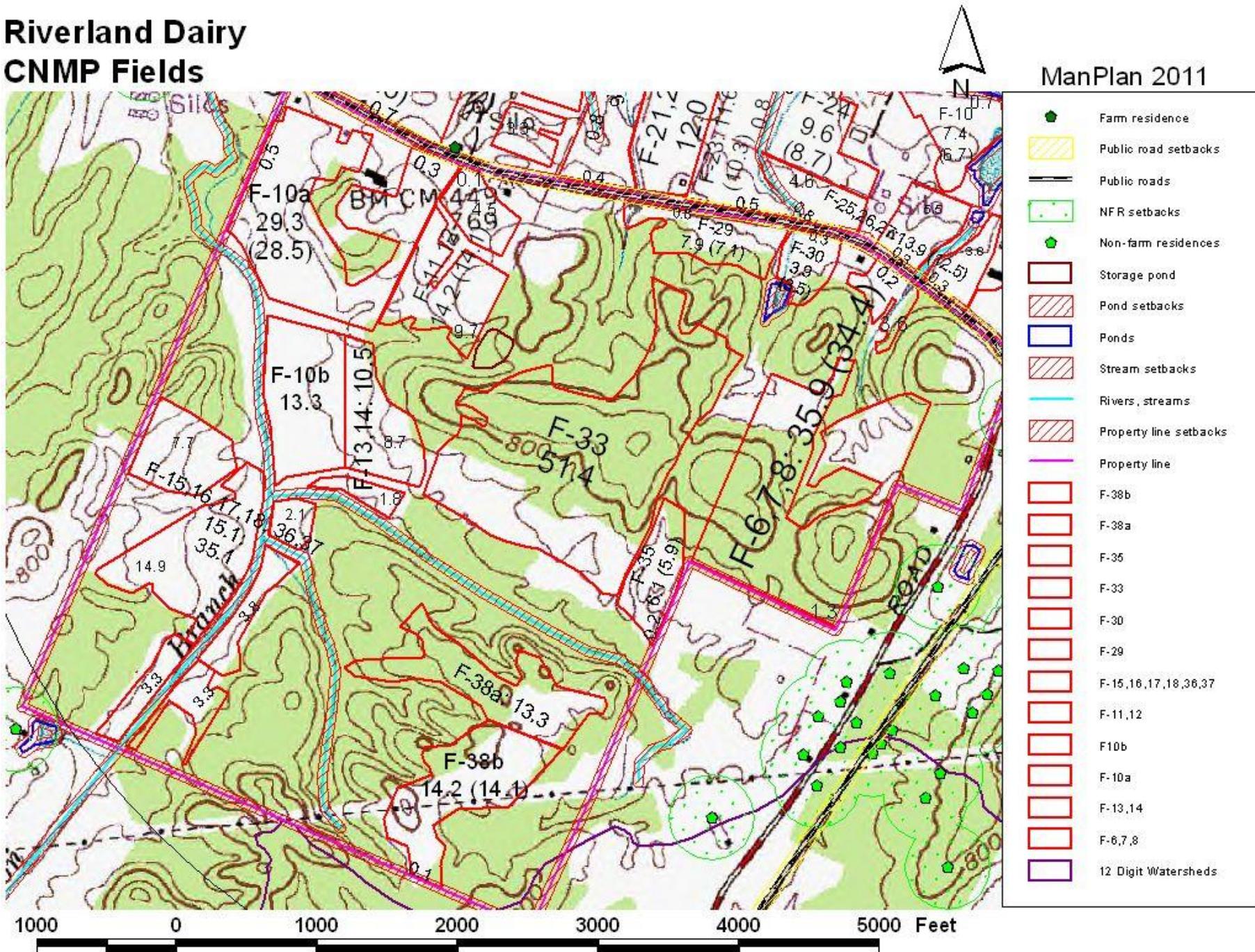


ManPlan 2011



Riverland Dairy

CNMP Fields



Riverland Dairy CNMP Fields



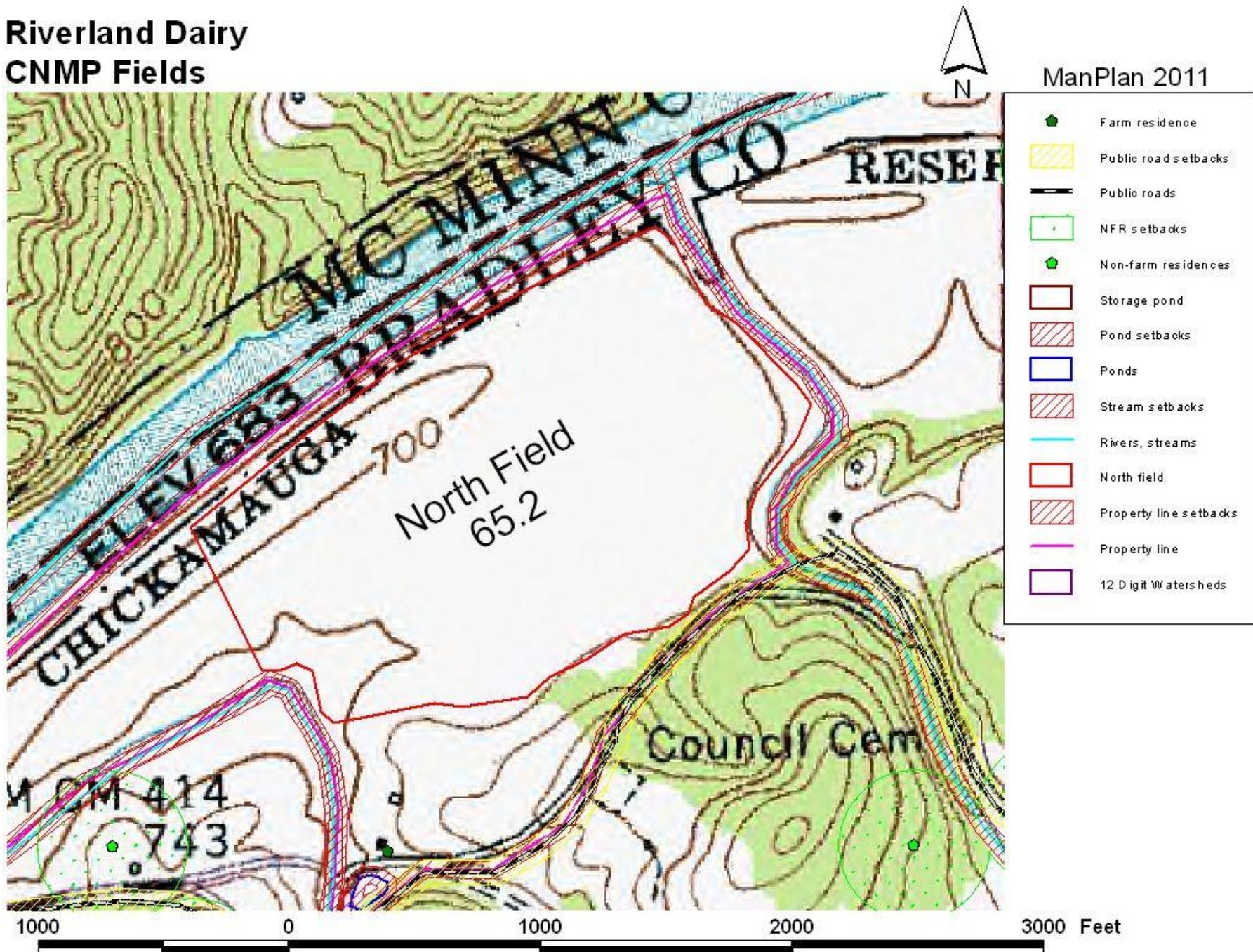
ManPlan 2011



	Farm residence
	Public road setbacks
	Public roads
	NFR setbacks
	Non-farm residences
	Storage pond
	Pond setbacks
	Ponds
	Stream setbacks
	Rivers, streams
	North field
	Property line setbacks
	Property line
	12 Digit Watersheds

3000 Feet

Riverland Dairy CNMP Fields



4.2. Land Treatment Conservation Practices

This section has individual field information for all fields in the nutrient management plan, including: Aerial photos and topographical maps, marked with setbacks and conservation practices implemented, soil tests results and RUSLE-2 individual field profiles.

Tabbed Information for each field:

- **FSA map**
- **Overview Map, (with conservation practices)**
- **Soil type maps**
- **RUSLE2 Individual Field Profile Report**
- **Soil Test results**

Necessary conservation practices have been established and maintained on cropland, hayfields and pastures where animal by-products are applied. All fields to maintain vegetative filter strips or riparian buffers along the river. Refer to the NRCS conservation plan for any additional practices that may be implemented on this farm.

The following NRCS Standard Practices apply to this CNMP and are included in Section 10 for reference.

313 - Waste Storage Structure
412 Fence
511 – Forage Harvest Management
523- Prescribed Grazing
590 -- Nutrient Management
633 -- Waste Utilization

Planned Land Treatment:

This section of the plan addresses management practices for all fields to reduce soil losses to or below tolerable soil losses or “T” values. Topography, soil types, slopes and lengths of slopes, crop yields, and crop management practices were taken into consideration as well as conservation practices and land treatment operations. RUSLE2 soil loss calculations were completed for all fields in this plan and field inspections were carried out in the spring of 2011.

All fields are below “T” levels with the current system of land treatment forage crops, grazing management and seeding practices.

Soil types present in the fields included in this Nutrient Management Plan are:

Code	Soil Description	Acres	Percent of field	Non-Irr Class
SeB	Sequatchie silt loam, 2 to 5 percent slopes, rarely flooded	205.8	27.0%	IIe
Ha	Hamblen silt loam, occasionally flooded	109.4	14.3%	IIw
WbC2	Waynesboro loam, 5 to 12 percent slopes, eroded	88.2	11.6%	IIIe
To	Toccoa loam, 0 to 4 percent slopes, rarely flooded	63	8.3%	IIw
ApC2	Apison-Armuchee complex, 5 to 12 percent slopes, eroded	54.6	7.2%	IIIe
WbB2	Waynesboro loam, 2 to 5 percent slopes, eroded	54.5	7.1%	IIe
WbD2	Waynesboro loam, 12 to 25 percent slopes, eroded	40.3	5.3%	IVe
LeB	Leadvale silt loam, 2 to 5 percent slopes, rarely flooded	34.6	4.5%	IIe
Sa	Sequatchie loam, undulating phase	33.8	4.4%	IIe
AnC2	Apison silt loam, 5 to 12 percent slopes, eroded	17.4	2.3%	IIIe
Sg	Staser loam	15.5	2.0%	IIw
Ea	Emory silt loam, 0 to 4 percent slopes, occasionally flooded	14	1.8%	IIw
ApD2	Apison-Armuchee complex, 12 to 25 percent slopes, eroded	9.6	1.3%	Ve
Ec	Etowah silt loam, eroded undulating phase	6	0.8%	IIe
Li	Lindside silt loam	4.6	0.6%	IIw
Eb	Etowah silt loam, eroded rolling phase	4.4	0.6%	IIIe
Bf	Bruno loamy fine sand	3.9	0.5%	IIIls
Wt	Whitwell loam, 0 to 3 percent slopes, occasionally flooded	2.5	0.3%	IIw
DeC2	Decatur silt loam, 5 to 12 percent slopes, eroded	0.3	0.0%	IIIe
W	Water	0.2	0.0%	
Cs	Cumberland silty clay loam, severely eroded hilly phase	0.1	0.0%	Vle

Include Soil Map Unit Descriptions next page.

Section 5. Soil and Risk Assessment Analysis

5.1. Soil Information

Field	Soil Survey	Map Unit	Soil Component Name	Surface Texture	Slope Range(%)	OM Range(%)	Bedrock Depth(in.)
B-4	139	SeB	Sequatchie	SIL	2-5%	1-3%	
B-6	139	WbB2	Waynesboro	L	2-5%	0.5-2%	
F-1	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-2	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-2,3-hay	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-3	139	Ha	Hamblen	SIL	0-2%	1-3%	
F-4	139	Ha	Hamblen	SIL	0-2%	1-3%	
F-5	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-6	139	WbC2	Waynesboro	L	5-12%	0.5-2%	
F-6,7,8	139	WbC2	Waynesboro	L	5-12%	0.5-2%	
F-7,8	139	Ha	Hamblen	SIL	0-2%	1-3%	
F-9	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-10	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-10A	139	WbC2	Waynesboro	L	5-12%	0.5-2%	
F-10B	139	LeB	Leadvale	SIL	2-5%	1-4%	
F-11,12	139	WbB2	Waynesboro	L	2-5%	0.5-2%	
F-13,14	139	ApC2	Apison	SIL	5-12%	1-3%	30
F-15-18,36,37	139	ApC2	Apison	SIL	5-12%	1-3%	30
F-19	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-20	139	Ha	Hamblen	SIL	0-2%	1-3%	
F-21,22	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-23A	139	SeB	Sequatchie	SIL	2-5%	1-3%	
F-23B	139	WbB2	Waynesboro	L	2-5%	0.5-2%	
F-23-pasture	139	Ha	Hamblen	SIL	0-2%	1-3%	
F-24	139	Ha	Hamblen	SIL	0-2%	1-3%	
F-25,26,27	139	Ha	Hamblen	SIL	0-2%	1-3%	
F-29	139	WbC2	Waynesboro	L	5-12%	0.5-2%	
F-30	139	WbC2	Waynesboro	L	5-12%	0.5-2%	
F-33	139	WbC2	Waynesboro	L	5-12%	0.5-2%	
F-35	139	WbC2	Waynesboro	L	5-12%	0.5-2%	
F-38A	139	ApC2	Apison	SIL	5-12%	1-3%	30
F-38B	139	ApC2	Apison	SIL	5-12%	1-3%	30
North Fld	011	Sa	Sequatchie	L	2-5%	1-3%	

5.2. Predicted Soil Erosion

Field	Predominant Soil Type	Slope (%)	Conserva-tion Plan Soil Loss (Ton/A/Yr)	Irrigation (Ton/A/Yr)	Gully (Ton/A/Yr)	Ephemeral (Ton/A/Yr)	T Factor (Ton/A/Yr)
B-4	SeB (Squatchie SIL)	4.0	0.0				5
B-6	WbB2 (Waynesboro L)	4.0	0.0				5
F-1	SeB (Squatchie SIL)	2.0	4.4				5
F-2	SeB (Squatchie SIL)	2.0	4.4				5
F-2,3-hay	SeB (Squatchie SIL)	2.0	0.1				5
F-3	Ha (Hamblen SIL)	1.0	3.6				5
F-4	Ha (Hamblen SIL)	1.0	3.4				5
F-5	SeB (Squatchie SIL)	2.0	0.4				5
F-6	WbC2 (Waynesboro L)	5.0	0.1				5
F-6,7,8	WbC2 (Waynesboro L)	5.0	1.5				5
F-7,8	Ha (Hamblen SIL)	1.0	0.6				5
F-9	SeB (Squatchie SIL)	2.0	4.4				5
F-10	SeB (Squatchie SIL)	2.0	0.0				5
F-10A	WbC2 (Waynesboro L)	5.0	2.4				5
F-10B	LeB (Leadvale SIL)	2.0	1.0				4
F-11,12	WbB2 (Waynesboro L)	2.0	0.0				5
F-13,14	ApC2 (Apison SIL)	5.0	3.2				3
F-15-18,36,37	ApC2 (Apison SIL)	5.0	3.2				3
F-19	SeB (Squatchie SIL)	2.0	1.9				5
F-20	Ha (Hamblen SIL)	1.0	0.1				5
F-21,22	SeB (Squatchie SIL)	2.0	1.2				5
F-23A	SeB (Squatchie SIL)	2.0	4.4				5
F-23B	WbB2 (Waynesboro L)	2.0	3.8				5
F-23-pasture	Ha (Hamblen SIL)	1.0	0.6				5
F-24	Ha (Hamblen SIL)	1.0	0.4				5
F-25,26,27	Ha (Hamblen SIL)	1.0	0.3				5
F-29	WbC2 (Waynesboro L)	5.0	1.5				5
F-30	WbC2 (Waynesboro L)	5.0	2.0				5
F-33	WbC2 (Waynesboro L)	5.0	0.3				5
F-35	WbC2 (Waynesboro L)	5.0	0.3				5
F-38A	ApC2 (Apison SIL)	5.0	2.6				3
F-38B	ApC2 (Apison SIL)	5.0	3.2				3
North Fld	SeB (Squatchie SIL)	2.0	1.5				5

All fields average less than 'T' for the crop rotations and conservation tillage practices shown in the Individual field reports in Section 4.

5.3. Nitrogen and Phosphorus Risk Analysis

Tennessee Phosphorus Index

The Tennessee Phosphorus (P) index was used to determine the potential for phosphorus transport off the fields. Considering all of the parameters that go into calculating the Phosphorus Index, Table 9 (next page), summarizes the P-Index for each field. Planned manure applications will not have a significant impact on the P-Index in the fields in this NMP unless exceeding the maximum rates listed on Table 9. All fields have P-Indexes rated MEDIUM at the indicated application rates for P₂O₅.

While soil test P is not the only factor affecting Phosphorus environmental risks, this plan does consider that soil P levels are very high for several of the application fields. The plan recommends that P₂O₅ applications for Field 'G' be discontinued so that P concentration in the soil will be reduced over time. Also for all other fields P₂O₅ applications should be limited to removal rates so that soil P values do not continue to increase for fields that are in the high to very high range for Phosphorus.

Environmental Considerations for Managing Phosphorus:

Phosphorus (P) loading to surface water can accelerate Eutrophication. The availability of other nutrients and light penetration into the water column will also influence the response of water bodies to phosphorus. Factors such as: the amount of erosion and runoff, the form, amount, and distribution of phosphorus in the soil; and fertilizer and manure application rate, timing and placement determine P loss from agricultural fields and the resulting P loading to water resources. Most phosphorus compounds found in soils have low water solubility. Consequently, P loss from agricultural land was once thought to be primarily associated with soil erosion. In many cases, sediment-bound P is still the dominant form in which P losses from agricultural fields occur. Over the past decade, research has shown that phosphorus can be lost in runoff in dissolved forms. High dissolved P concentration in runoff is more frequently observed where soil P levels are high particularly near the soil surface. High soil P levels, however, do not automatically equate to high dissolved P in runoff. As stated earlier, numerous factors interact to create the potential for P losses from agricultural fields. Many of the basic processes that govern P transport are known.

The Tennessee P Index rates the application fields based on the following factors:

- Soil Test P
- P₂O₅ application rate (all sources)
- Form of Phosphorus applied
- Timing of Phosphorus applications
- Method of application
- Hydrological group rating of the soils in the application field.
- Buffer and Setback widths, slopes % and length, vegetative cover, and soil texture

According to the NRCS nutrient management standard, fields ranked in the MEDIUM risk category may receive organic (manure) or inorganic (commercial fertilizer) applications at nitrogen-based rates per the table below.

Total Points from P Index	Generalized Interpretation of P Index Points for the Site
< 100	LOW potential for P movement from the field. If farming practices are maintained at the current level there is a low probability of an adverse impact to surface waters from P losses. Nitrogen-based nutrient management planning is satisfactory for this site. Soil P levels and P loss potential may increase in the future due to N-based nutrient management.
100 - 200	MEDIUM potential for P movement from the field. The chance for adverse impact to surface waters exists. <i>Nitrogen-based nutrient management planning may be satisfactory for this field when conservation measures are implemented to lessen the probability of P loss.</i> Soil P levels and P loss potential may increase in the future due to N-based nutrient management.
201 - 300	HIGH potential for P movement from the field. The chance for adverse impact to surface waters is likely unless remedial action is taken. Soil and water conservation practices are necessary (if practical) to reduce the risk of P movement and water quality degradation. If risk cannot be reduced, then a P-based nutrient management plan will be implemented.
> 301	VERY HIGH potential for P movement from the field and an adverse impact on surface waters. All necessary soil and water conservation practices, plus a P-based nutrient management plan must be put in place to avoid the potential for water quality degradation.

Tennessee Phosphorus Index

Field	Crop Year	Site and Transport Factor	Mgmt. and Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
B-4	2012	6	20	6	120	Medium
B-4	2013	6	20	6	120	Medium
B-4	2014	6	20	6	120	Medium
B-4	2015	6	20	6	120	Medium
B-4	2016	6	20	6	120	Medium
B-6	2012	6	20	6	120	Medium
B-6	2013	6	20	6	120	Medium
B-6	2014	6	20	6	120	Medium
B-6	2015	6	20	6	120	Medium
B-6	2016	6	20	6	120	Medium
F-1	2012	8	15	32	120	Medium
F-1	2013	8	15	32	120	Medium
F-1	2014	8	15	32	120	Medium
F-1	2015	8	15	32	120	Medium
F-1	2016	8	15	32	120	Medium
F-2	2012	8	15	32	120	Medium
F-2	2013	8	15	32	120	Medium
F-2	2014	8	15	32	120	Medium
F-2	2015	8	15	32	120	Medium
F-2	2016	8	15	32	120	Medium
F-2,3-hay	2012	6	16	24	96	Low
F-2,3-hay	2013	6	4	24	24	Low
F-2,3-hay	2014	6	4	24	24	Low
F-2,3-hay	2015	6	16	24	96	Low
F-2,3-hay	2016	6	4	24	24	Low
F-3	2012	8	1	8	8	Low
F-3	2013	8	1	8	8	Low
F-3	2014	8	12	8	96	Low
F-3	2015	8	12	8	96	Low
F-3	2016	8	12	8	96	Low
F-4	2012	8	12	8	96	Low
F-4	2013	8	12	8	96	Low
F-4	2014	8	12	8	96	Low
F-4	2015	8	12	8	96	Low
F-4	2016	8	12	8	96	Low
F-5	2012	6	15	6	90	Low
F-5	2013	6	1	6	6	Low
F-5	2014	6	15	6	90	Low
F-5	2015	6	1	6	6	Low
F-5	2016	6	1	6	6	Low
F-6	2012	6	8	48	48	Low

Field	Crop Year	Site and Transport Factor	Mgmt. and Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
F-6	2013	6	8	48	48	Low
F-6	2014	6	8	48	48	Low
F-6	2015	6	8	48	48	Low
F-6	2016	6	33	48	198	Medium
F-6,7,8	2012	6	1	6	6	Low
F-6,7,8	2013	6	15	6	90	Low
F-6,7,8	2014	6	1	6	6	Low
F-6,7,8	2015	6	15	6	90	Low
F-6,7,8	2016	6	1	6	6	Low
F-7,8	2012	8	4	32	32	Low
F-7,8	2013	8	4	32	32	Low
F-7,8	2014	8	4	32	32	Low
F-7,8	2015	8	4	32	32	Low
F-7,8	2016	8	4	32	32	Low
F-9	2012	8	15	32	120	Medium
F-9	2013	8	15	32	120	Medium
F-9	2014	8	15	32	120	Medium
F-9	2015	8	15	32	120	Medium
F-9	2016	8	15	32	120	Medium
F-10	2012	6	13	6	78	Low
F-10	2013	6	13	6	78	Low
F-10	2014	6	13	6	78	Low
F-10	2015	6	13	6	78	Low
F-10	2016	6	13	6	78	Low
F-10A	2012	6	4	24	24	Low
F-10A	2013	6	4	24	24	Low
F-10A	2014	6	4	24	24	Low
F-10A	2015	6	4	24	24	Low
F-10A	2016	6	4	24	24	Low
F-10B	2012	8	1	8	8	Low
F-10B	2013	8	15	8	120	Medium
F-10B	2014	8	15	8	120	Medium
F-10B	2015	8	1	8	8	Low
F-10B	2016	8	1	8	8	Low
F-11,12	2012	6	8	48	48	Low
F-11,12	2013	6	8	48	48	Low
F-11,12	2014	6	8	48	48	Low
F-11,12	2015	6	8	48	48	Low
F-11,12	2016	6	8	48	48	Low
F-13,14	2012	6	2	12	12	Low
F-13,14	2013	6	2	12	12	Low
F-13,14	2014	6	2	12	12	Low
F-13,14	2015	6	2	12	12	Low

Field	Crop Year	Site and Transport Factor	Mgmt. and Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
F-13,14	2016	6	2	12	12	Low
F-15-18,36,37	2012	6	4	24	24	Low
F-15-18,36,37	2013	6	4	24	24	Low
F-15-18,36,37	2014	6	4	24	24	Low
F-15-18,36,37	2015	6	4	24	24	Low
F-15-18,36,37	2016	6	4	24	24	Low
F-19	2012	6	15	24	90	Low
F-19	2013	6	15	24	90	Low
F-19	2014	6	15	24	90	Low
F-19	2015	6	15	24	90	Low
F-19	2016	6	15	24	90	Low
F-20	2012	8	1	8	8	Low
F-20	2013	8	13	8	104	Medium
F-20	2014	8	11	8	88	Low
F-20	2015	8	11	8	88	Low
F-20	2016	8	11	8	88	Low
F-21,22	2012	6	2	12	12	Low
F-21,22	2013	6	2	12	12	Low
F-21,22	2014	6	2	12	12	Low
F-21,22	2015	6	2	12	12	Low
F-21,22	2016	6	2	12	12	Low
F-23A	2012	8	15	32	120	Medium
F-23A	2013	8	15	32	120	Medium
F-23A	2014	8	15	32	120	Medium
F-23A	2015	8	15	32	120	Medium
F-23A	2016	8	15	32	120	Medium
F-23B	2012	6	15	24	90	Low
F-23B	2013	6	15	24	90	Low
F-23B	2014	6	15	24	90	Low
F-23B	2015	6	15	24	90	Low
F-23B	2016	6	15	24	90	Low
F-23-pasture	2012	8	2	16	16	Low
F-23-pasture	2013	8	2	16	16	Low
F-23-pasture	2014	8	2	16	16	Low
F-23-pasture	2015	8	2	16	16	Low
F-23-pasture	2016	8	2	16	16	Low
F-24	2012	8	1	8	8	Low
F-24	2013	8	11	8	88	Low
F-24	2014	8	1	8	8	Low
F-24	2015	8	11	8	88	Low
F-24	2016	8	1	8	8	Low
F-25,26,27	2012	8	1	8	8	Low
F-25,26,27	2013	8	11	8	88	Low

Field	Crop Year	Site and Transport Factor	Mgmt. and Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
F-25,26,27	2014	8	11	8	88	Low
F-25,26,27	2015	8	1	8	8	Low
F-25,26,27	2016	8	11	8	88	Low
F-29	2012	6	1	6	6	Low
F-29	2013	6	15	6	90	Low
F-29	2014	6	1	6	6	Low
F-29	2015	6	15	6	90	Low
F-29	2016	6	1	6	6	Low
F-30	2012	6	1	6	6	Low
F-30	2013	6	1	6	6	Low
F-30	2014	6	1	6	6	Low
F-30	2015	6	16	6	96	Low
F-30	2016	6	1	6	6	Low
F-33	2012	6	16	6	96	Low
F-33	2013	6	16	6	96	Low
F-33	2014	6	16	6	96	Low
F-33	2015	6	9	6	54	Low
F-33	2016	6	16	6	96	Low
F-35	2012	6	16	6	96	Low
F-35	2013	6	16	6	96	Low
F-35	2014	6	16	6	96	Low
F-35	2015	6	9	6	54	Low
F-35	2016	6	16	6	96	Low
F-38A	2012	6	1	6	6	Low
F-38A	2013	6	1	6	6	Low
F-38A	2014	6	1	6	6	Low
F-38A	2015	6	15	6	90	Low
F-38A	2016	6	1	6	6	Low
F-38B	2012	6	1	6	6	Low
F-38B	2013	6	1	6	6	Low
F-38B	2014	6	1	6	6	Low
F-38B	2015	6	1	6	6	Low
F-38B	2016	6	1	6	6	Low
North Fld	2012	6	24	12	144	Medium
North Fld	2013	6	31	12	186	Medium
North Fld	2014	6	30	12	180	Medium
North Fld	2015	6	31	12	186	Medium
North Fld	2016	6	29	12	174	Medium

5.4. Additional Field Data Required by Risk Assessment Procedure

Field	Distance to Water (Feet)	Slope Length (Feet)	Buffer Width (Feet)	Tillage/Cover Type
B-4	425	200	40	Pasture/Hay
B-6	1,125	200	40	Pasture/Hay
F-1	900	300	40	No-till w/ light to medium residues
F-2	875	300	40	No-till w/ light to medium residues
F-2,3-hay	150	100	40	Pasture/Hay
F-3	1,900	100	40	No-till w/ light to medium residues
F-4	1,950	100	40	No-till w/ light to medium residues
F-5	350	200	40	Pasture/Hay
F-6	1,125	100	40	Pasture/Hay
F-6,7,8	1,050	100	40	Pasture/Hay
F-7,8	400	100	40	Pasture/Hay
F-9	850	300	40	No-till w/ light to medium residues
F-10	200	100	40	Pasture/Hay
F-10A	625	100	40	Pasture/Hay
F-10B	300	100	40	Pasture/Hay
F-11,12	1,475	100	40	Pasture/Hay
F-13,14	550	100	40	Pasture/Hay
F-15-18,36,37	300	100	40	Pasture/Hay
F-19	925	100	40	No-till w/ light to medium residues
F-20	1,950	300	40	Pasture/Hay
F-21,22	675	100	40	Pasture/Hay
F-23A	400	300	40	No-till w/ light to medium residues
F-23B	775	300	40	No-till w/ light to medium residues
F-23-pasture	175	100	40	Pasture/Hay
F-24	350	100	40	Pasture/Hay
F-25,26,27	550	100	40	Pasture/Hay
F-29	400	100	40	Pasture/Hay
F-30	200	100	40	Pasture/Hay
F-33	1,475	300	40	Pasture/Hay
F-35	675	100	40	Pasture/Hay
F-38A	525	100	40	Pasture/Hay
F-38B	1,050	100	40	Pasture/Hay
North Fld	800	300	40	No-till w/ light to medium residues

Nitrogen Leaching Risk Assessment and Nitrogen Management:

Nitrogen Leaching potential was assessed for all the fields in this CNMP using the nationally accepted "Colorado Nitrogen Leaching Index Risk Assessment" tool.

The results are listed in a table on the following page. All of the fields have LOW ratings under the planned management for crops grown and nitrogen sources applied.

Permeability Class, irrigation methods and efficiencies, Manure effluent application rates, application timing and mitigating practices implemented were factors considered to make this determination.

The following practices are additional recommendations as part of an overall nutrient management plan to reduce nitrogen losses to groundwater by leaching.

1. Set realistic yield goals and consider University of Tennessee nitrogen recommendations for crops grown.
2. Properly sample lagoon effluent applied to determine actual Nitrogen and other plant nutrients being applied.
3. Apply nitrogen in split applications during the growing season to reduce leaching losses and improve plant utilization of nitrogen by supplying N nearer to the times when the plants need the most nitrogen, at green up in the spring and after hay harvests throughout the summer.
4. Take credit for nitrogen from **all** sources: previously grown legume crops, nitrogen contained in any fertilizer products applied, manure applications, etc.
5. Conduct a post-harvest evaluation of the nitrogen program:
 - Compare actual yields vs. yield goal;
 - Evaluate factors affecting yields and nitrogen use efficiency;
 - Consider using plant tissue sampling and nitrate tests to evaluate plant nitrogen sufficiency;
 - Refine nitrogen rates for future years.
6. Consider taking some deep soil tests in the spring to determine nitrogen availability & movement in the soil.
7. Review each nutrient management plan annually to determine if changes in the nutrient budget are needed.
8. Calibrate application equipment annually, at minimum, to ensure uniform distribution of material at planned rates.
9. Avoid applying nitrogen around environmentally sensitive areas such as sinkholes, wells, gullies, ditches, surface inlets, or rapidly permeable areas.
10. Observe all manure and effluent application setbacks and/of buffers for irrigation and other manures or compost applications.

NRCS National - Nitrogen Leaching Tool

Nitrogen Leaching Index Risk Assessment (Version 2.0)

Factor	Low (1)	Medium (2)	High (3)	Very High (4)	Score
1. Permeability Class	Very slow, slow, and mod slow	Moderate	Moderately rapid	Rapid and very rapid	2
2. Irrigation Application Efficiency	High >85%	Moderate 60-85%	Moderately Low 35 – 60%	Low , 35%	0
3a. Nitrogen Application Rate (commercial N fertilizer with or without manure)	Total N application below agronomic rate	Total N application rate equal to agronomic rate	Total N application rate is 1 to 50 lbs/acre above agronomic rate	Total N application rate is > 50 lbs/acre above agronomic rate	2
3b. Manure Effluent Application Rate (no commercial N fertilizer)	Applied at P agronomic rate	Applied at N agronomic rate	Applied above N agronomic rate	Applied above N agronomic rate more than one consecutive year.	2
4. Application Timing	In season split application (2 or more splits)	Any nitrogen application 0-3 months before crop planting	Any nitrogen application 3-5 months before crop planting	Any nitrogen application more than 5 months before crop planting	1
GROSS SCORE (Sum of 1 thru 4)					7
5. Best Management Practice (BMP) Implementation Credits: Subtract 1 point for each of the following BMP's implemented in the field: < <i>Slow Release Fertilizers</i> >; < Cover Crops >; < <i>Nitrification Inhibitors*</i> >; < Deep Rooted Crops in Rotation >; < <i>Deep Soil Sampling to determine sub-soil N credit</i> >;					2
Net Score; (Sum of factors 1 thru 4 minus factor 5, BMP credits)					5

Net Score	Risk Interpretations
< 8	This field has a LOW risk for nitrogen leaching if management is maintained at the current level. If there is an underlying aquifer that is shallow (< 20 ft) or used locally as a public drinking water source, increase the risk to MEDIUM .
8 to 11	This field has a MEDIUM risk for nitrogen leaching and some management changes may be needed to decrease risk. Apply nitrogen at agronomic rates or lower using spring or split in-season applications. If there is an underlying aquifer that is shallow (< 20 ft) or used locally as a public drinking water source, increase the risk to HIGH .
12 to 15	This field has a High -risk for nitrogen leaching and management changes should be implemented to decrease risk. Manure should be applied at P agronomic rates. Apply nitrogen using split in-season applications at or below the agronomic rate. Changes in irrigation management and/or method may also be necessary. If there is an underlying aquifer that is shallow (< 20 ft) or used locally as a public drinking water source, increase the risk to VERY HIGH .
>16	This field has a VERY High -risk for nitrogen leaching and management changes are needed to decrease risk. Manure applications are NOT recommended . Apply nitrogen using split in-season applications at or below the agronomic rate. Changes in irrigation management and/or method are necessary to protect ground water. Implement all appropriate BMPs.

Section 6. Nutrient Management

6.1. Field Information

Field ID	Sub-field ID	Total Acres	Spreadable Acres	County	Predominant Soil Type	Slope (%)	FSA Farm	FSA Tract	FSA Field
B-4		26.6	26.5	Polk	SeB (Squatchie SIL)	4.0		371	4
B-6		21.4	21.4	Polk	WbB2 (Waynesboro L)	4.0		371	6
F-1		35.9	35.4	Polk	SeB (Squatchie SIL)	2.0		353	1
F-2		36.2	36.2	Polk	SeB (Squatchie SIL)	2.0		353	2
F-2,3-hay		3.0	2.6	Polk	SeB (Squatchie SIL)	2.0		190	2
F-3		8.8	8.2	Polk	Ha (Hamblen SIL)	1.0		353	3
F-4		12.8	12.1	Polk	Ha (Hamblen SIL)	1.0		353	4
F-5		27.7	27.7	Polk	SeB (Squatchie SIL)	2.0		353	5
F-6		15.3	14.6	Polk	WbC2 (Waynesboro L)	5.0		353	6
F-6,7,8		35.9	34.6	Polk	WbC2 (Waynesboro L)	5.0		190	678
F-7,8		21.6	20.4	Polk	Ha (Hamblen SIL)	1.0		353	7
F-9		38.9	37.9	Polk	SeB (Squatchie SIL)	2.0		190	9
F-10		7.4	6.7	Polk	SeB (Squatchie SIL)	2.0		190	10
F-10A		29.3	28.5	Polk	WbC2 (Waynesboro L)	5.0		353	10
F-10B		13.3	13.3	Polk	LeB (Leadvale SIL)	2.0		353	10
F-11,12		14.2	14.1	Polk	WbB2 (Waynesboro L)	2.0		353	1112
F-13,14		10.5	10.5	Polk	ApC2 (Apison SIL)	5.0		353	1314
F-15-18,36,37		35.1	35.1	Polk	ApC2 (Apison SIL)	5.0		353	
F-19		76.3	75.4	Polk	SeB (Squatchie SIL)	2.0		353	19
F-20		12.8	11.8	Polk	Ha (Hamblen SIL)	1.0		353	20
F-21,22		12.0	12.0	Polk	SeB (Squatchie SIL)	2.0		353	2122
F-23A		22.3	21.6	Polk	SeB (Squatchie SIL)	2.0		190	23
F-23B		22.0	20.6	Polk	WbB2 (Waynesboro L)	2.0		190	23
F-23-pasture		11.6	10.3	Polk	Ha (Hamblen SIL)	1.0		353	23
F-24		9.6	8.7	Polk	Ha (Hamblen SIL)	1.0		353	24
F-25,26,27		13.9	12.5	Polk	Ha (Hamblen SIL)	1.0		353	
F-29		7.9	7.1	Polk	WbC2 (Waynesboro L)	5.0		353	28
F-30		3.9	3.5	Polk	WbC2 (Waynesboro L)	5.0		353	30
F-33		51.4	51.4	Polk	WbC2 (Waynesboro L)	5.0		353	33
F-35		6.1	5.9	Polk	WbC2 (Waynesboro L)	5.0		353	35
F-38A		13.3	13.3	Polk	ApC2 (Apison SIL)	5.0		353	38
F-38B		14.2	14.1	Polk	ApC2 (Apison SIL)	5.0		353	38
North Fld		65.2	65.2	Bradley	Sa (Squatchie L)	2.0		371	1
Total Acres:		736.4	654						

OVERVIEW:

This Nutrient Management Plan conforms to the Tennessee NRCS 590 Standard Practice

P1, Phosphorus:

Soil Sample results indicated that fields range from Low to Very High for soil P. Over time the manure applications recommended are expected to maintain or build soil P towards optimum for most fields, but planned to be limited to a P replacement rate for Field 5 which is very high in Phosphorus. Planned applications will not increase the P Index above Medium for any fields. (The Phosphorus Index, a measure of risk of phosphorus pollution, is rated Low to Medium for all fields that are planned to receive manure)

K, Potassium:

Soil Sample results indicated that fields range from Low to Very High for soil Potassium (K) Over time the manure applications recommended are expected to maintain or build soil K towards optimum levels. Hay & silage removes relatively large amounts of potassium from the soil and manure applications are a good way to add potassium back to the soil.

pH: For maximum yields and soil fertility, it is recommended to maintain a soil pH of at least 6.0 for corn & small grains rotations. If pH is less than 6.0, liming material should be applied at U of I recommended rates based on the CCE (Calcium Carbonate Equivalent) rating and the fineness of the limestone material. If alfalfa or clover is part of the rotation pH should be maintained between 6.5 and 7.0. All fields currently are within the optimal range for planned crop rotations with the exception of Fields: B6, 6,7,8, 20, 24, & 38B. Lime is recommended at this time for B6, 6, 7, 8, 20, 24, & 38B at 2 to 2.5 tons per acre. Fields should be retested at least 6 months after lime is applied to re-evaluate pH.

Guidance in developing a nutrient budget may be obtained from your NRCS Field Office or your University of Tennessee Agricultural Extension Service Agent. Land application procedures must be planned and implemented in a way that minimizes potential adverse impacts to the environment and public health.

6.2. Manure Application Setback Distances

Setback Requirements: Class I CAFO

Feature	Setback Criteria	Setback Distance (Feet)
Streams	Applied upgradient, permanent vegetated setback >=35 feet	35
Streams	New operation, near high quality stream	60
Surface waters	Applied upgradient, permanent vegetated setback >=35 feet	35
Open tile line inlet structures	Applied upgradient, permanent vegetated setback >=35 feet	35
Sinkholes	Applied upgradient, permanent vegetated setback >=35 feet	35
Agricultural well heads	Applied upgradient, permanent vegetated setback >=35 feet	35
Other conduits to surface waters	Applied upgradient, permanent vegetated setback >=35 feet	35
Potable well, public or private	Application down-gradient of feature	150
Potable well, public or private	Application upgradient of feature	300

Source: TN DEQ Rule 1200-4-5-.14(17)(d) (<http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf>)

Setback Requirements: Class II CAFO

Feature	Setback Criteria	Setback Distance (Feet)
Streams	Applied upgradient, permanent vegetated setback >=35 feet	35
Streams	New operation, near high quality stream	60
Surface waters	Applied upgradient, permanent vegetated setback >=35 feet	35
Open tile line inlet structures	Applied upgradient, permanent vegetated setback >=35 feet	35
Sinkholes	Applied upgradient, permanent vegetated setback >=35 feet	35
Agricultural well heads	Applied upgradient, permanent vegetated setback >=35 feet	35
Other conduits to surface waters	Applied upgradient, permanent vegetated setback >=35 feet	35
Potable well, public or private	Application upgradient of feature	300
Potable well, public or private	Application down-gradient of feature	150

Source: TN DEQ Rule 1200-4-5-.14(17)(d) (<http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf>)

Setback Requirements: NRCS Standard

Feature	Setback Criteria	Setback Distance (Feet)
Well	Application upgradient of feature	300
Well	Application down-gradient of feature	150
Waterbody	Predominant slope <5% with good vegetation	30
Waterbody	Predominant slope 5 to 8% with good vegetation	50
Waterbody	Predominant slope >8%	100
Waterbody	Poor vegetation	100
Public road	All applications	50
Dwelling (other than producer)	All applications	300
Public use area	All applications	300
Property line	Application upgradient of feature	30

Source: Nutrient Management Standard 590
[http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_\(590\)_Standard.doc](http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

6.3. Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/100g)
B-4	2011		Mehlich-1 ICP	23	30	484	1,638	lbs/a	6.9		
B-6	2011		Mehlich-1 ICP	18	184	207	904	lbs/a	5.5	7.45	
F-1	2011		Mehlich-1 ICP	90	415	645	2,720	lbs/a	6.3		
F-2	2011		Mehlich-1 ICP	120	309	651	2,645	lbs/a	6.2		
F-2,3-hay	2011		Mehlich-1 ICP	127	282	897	3,894	lbs/a	6.6		
F-3	2011		Mehlich-1 ICP	17	80	485	2,311	lbs/a	7.0		
F-4	2011		Mehlich-1 ICP	14	73	534	2,296	lbs/a	7.0		
F-5	2011		Mehlich-1 ICP	35	152	296	1,797	lbs/a	6.7		
F-6	2011		Mehlich-1 ICP	399	668	695	3,909	lbs/a	6.4		
F-6,7,8	2011		Mehlich-1 ICP	14	77	298	1,332	lbs/a	5.9	7.47	
F-7,8	2011		Mehlich-1 ICP	115	55	375	2,925	lbs/a	6.0		
F-9	2011		Mehlich-1 ICP	114	300	544	2,293	lbs/a	6.6		
F-10	2011		Mehlich-1 ICP	11	59	289	1,636	lbs/a	6.1		
F-10A	2011		Mehlich-1 ICP	77	264	438	2,255	lbs/a	6.7		
F-10B	2011		Mehlich-1 ICP	12	61	347	1,596	lbs/a	6.2		
F-11,12	2011		Mehlich-1 ICP	267	449	413	2,139	lbs/a	6.4		
F-13,14	2011		Mehlich-1 ICP	52	117	421	2,206	lbs/a	6.1		
F-15-18,36,37	2011		Mehlich-1 ICP	129	39	116	2,466	lbs/a	6.4		
F-19	2011		Mehlich-1 ICP	145	405	706	2,888	lbs/a	6.5		
F-20	2011		Mehlich-1 ICP	10	24	177	1,355	lbs/a	5.7	7.48	
F-21,22	2011		Mehlich-1 ICP	50	427	500	2,125	lbs/a	6.1		
F-23A	2011		Mehlich-1 ICP	95	331	588	2,072	lbs/a	6.6		
F-23B	2011		Mehlich-1 ICP	148	442	701	2,563	lbs/a	6.7		
F-23-pasture	2011		Mehlich-1 ICP	50	427	500	2,125	lbs/a	6.1		
F-24	2011		Mehlich-1 ICP	12	35	56	484	lbs/a	4.9	7.57	
F-25,26,27	2011		Mehlich-1 ICP	24	360	451	2,231	lbs/a	7.0		
F-29	2011		Mehlich-1 ICP	19	75	324	1,658	lbs/a	6.3		
F-30	2011		Mehlich-1 ICP	18	160	343	1,584	lbs/a	6.4		
F-33	2011		Mehlich-1 ICP	19	228	326	1,385	lbs/a	6.5		
F-35	2011		Mehlich-1 ICP	13	200	308	1,352	lbs/a	6.2		
F-38A	2011		Mehlich-1 ICP	8	49	392	1,672	lbs/a	6.6		
F-38B	2011		Mehlich-1 ICP	7	96	444	1,662	lbs/a	5.8	7.48	
North Fld	2011		Mehlich-1 ICP	39	175	441	1,653	lbs/a	6.3		

6.4. Manure Nutrient Analysis

Manure Source	Dry Matter (%)	Total N	NH ₄ -N	Total P ₂ O ₅	Total K ₂ O	Avail. P ₂ O ₅	Avail. K ₂ O	Units	Analysis Source and Date
Storage pond	1.5	21.0	6.3	4.5	10.8	4.5	10.8	Lb/1000Gal	CVAS Maugansville, MD 21767 12/16/09
Dry pack	89.6	48.0	0.6	27.0	54.1	27.0	54.1	Lb/Ton	Analab, Fulton, IL; 9/14/11
calf barn	75.0	6.5	1.3	2.3	2.7	2.3	2.7	Lb/Ton	MMP estimated values

(1) Entered analysis may be the average of several individual analyses.

(2) Tennessee assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Tennessee, see "Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94 (http://wastemgmt.ag.utk.edu/ExtensionProjects/extension_publications.htm).

6.5. Planned Crops and Fertilizer Recommendations

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
B-4	2012	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
B-4	2013	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
B-4	2014	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
B-4	2015	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
B-4	2016	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
B-6	2012	Grass-clover hay maint	4.0 Ton	60	60	30	200	60	240	
B-6	2013	Grass-clover hay maint	4.0 Ton	60	60	30	200	60	240	
B-6	2014	Grass-clover hay maint	4.0 Ton	60	60	30	200	60	240	
B-6	2015	Grass-clover hay maint	4.0 Ton	60	60	30	200	60	240	
B-6	2016	Grass-clover hay maint	4.0 Ton	60	60	30	200	60	240	
F-1	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-1	2012	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-1	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-1	2013	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-1	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-1	2014	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-1	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-1	2015	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-1	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-1	2016	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-2	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-2	2012	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-2	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-2	2013	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-2	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-2	2014	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-2	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-2	2015	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-2	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-2	2016	Corn silage	27.0 Ton	180	0	0	224	97	224	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
F-2,3-hay	2012	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
F-2,3-hay	2013	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
F-2,3-hay	2014	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
F-2,3-hay	2015	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
F-2,3-hay	2016	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
F-3	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-3	2012	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-3	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-3	2013	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-3	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-3	2014	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-3	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-3	2015	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-3	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-3	2016	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-4	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-4	2012	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-4	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-4	2013	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-4	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-4	2014	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-4	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-4	2015	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-4	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	80	80	196	70	210	
F-4	2016	Corn silage	27.0 Ton	180	200	300	224	97	224	
F-5	2012	Grass-clover pastur maint	4.0 Ton	30	30	30	200	60	240	
F-5	2013	Grass-clover pastur maint	4.0 Ton	30	30	30	200	60	240	
F-5	2014	Grass-clover pastur maint	4.0 Ton	30	30	30	200	60	240	
F-5	2015	Grass-clover pastur maint	4.0 Ton	30	30	30	200	60	240	
F-5	2016	Grass-clover pastur maint	4.0 Ton	30	30	30	200	60	240	
F-6	2012	Bermuda hybrid pasture	6.0 Ton	180	0	0	276	72	300	
F-6	2013	Bermuda hybrid pasture	6.0 Ton	180	0	0	276	72	300	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
F-6	2014	Bermuda hybrid pasture	6.0 Ton	180	0	0	276	72	300	
F-6	2015	Bermuda hybrid pasture	6.0 Ton	180	0	0	276	72	300	
F-6	2016	Bermuda hybrid pasture	6.0 Ton	180	0	0	276	72	300	
F-6,7,8	2012	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-6,7,8	2013	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-6,7,8	2014	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-6,7,8	2015	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-6,7,8	2016	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-7,8	2012	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-7,8	2013	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-7,8	2014	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-7,8	2015	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-7,8	2016	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-9	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-9	2012	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-9	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-9	2013	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-9	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-9	2014	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-9	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-9	2015	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-9	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-9	2016	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-10	2012	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
F-10	2013	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
F-10	2014	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
F-10	2015	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
F-10	2016	Grass-clover hay maint	4.0 Ton	60	60	60	200	60	240	
F-10A	2012	Grass-clover pastur maint	3.0 Ton	30	0	0	150	45	180	
F-10A	2013	Grass-clover pastur maint	3.0 Ton	30	0	0	150	45	180	
F-10A	2014	Grass-clover pastur maint	3.0 Ton	30	0	0	150	45	180	
F-10A	2015	Grass-clover pastur maint	3.0 Ton	30	0	0	150	45	180	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
F-10A	2016	Grass-clover pastur maint	3.0 Ton	30	0	0	150	45	180	
F-10B	2012	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-10B	2013	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-10B	2014	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-10B	2015	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-10B	2016	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-11,12	2012	Bermuda hybrid pasture	8.0 Ton	180	0	0	368	96	400	
F-11,12	2013	Bermuda hybrid pasture	8.0 Ton	180	0	0	368	96	400	
F-11,12	2014	Bermuda hybrid pasture	8.0 Ton	180	0	0	368	96	400	
F-11,12	2015	Bermuda hybrid pasture	8.0 Ton	180	0	0	368	96	400	
F-11,12	2016	Bermuda hybrid pasture	8.0 Ton	180	0	0	368	96	400	
F-13,14	2012	Grass-clover pastur maint	3.0 Ton	30	30	30	150	45	180	
F-13,14	2013	Grass-clover pastur maint	3.0 Ton	30	30	30	150	45	180	
F-13,14	2014	Grass-clover pastur maint	3.0 Ton	30	30	30	150	45	180	
F-13,14	2015	Grass-clover pastur maint	3.0 Ton	30	30	30	150	45	180	
F-13,14	2016	Grass-clover pastur maint	3.0 Ton	30	30	30	150	45	180	
F-15-18,36,37	2012	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-15-18,36,37	2013	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-15-18,36,37	2014	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-15-18,36,37	2015	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-15-18,36,37	2016	Grass-clover pastur maint	3.0 Ton	30	0	60	150	45	180	
F-19	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-19	2012	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-19	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-19	2013	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-19	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-19	2014	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-19	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-19	2015	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-19	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
F-19	2016	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-20	2012	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-20	2013	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-20	2014	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-20	2015	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-20	2016	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-21,22	2012	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-21,22	2013	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-21,22	2014	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-21,22	2015	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-21,22	2016	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-23A	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23A	2012	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23A	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23A	2013	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23A	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23A	2014	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23A	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23A	2015	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23A	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23A	2016	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23B	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23B	2012	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23B	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23B	2013	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23B	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23B	2014	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23B	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23B	2015	Corn silage	27.0 Ton	180	0	0	224	97	224	
F-23B	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	0	0	196	70	210	
F-23B	2016	Corn silage	27.0 Ton	180	0	0	224	97	224	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
F-23-pasture	2012	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-23-pasture	2013	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-23-pasture	2014	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-23-pasture	2015	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-23-pasture	2016	Grass-clover pastur maint	3.0 Ton	30	30	0	150	45	180	
F-24	2012	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-24	2013	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-24	2014	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-24	2015	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-24	2016	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-25,26,27	2012	Grass-clover pastur maint	3.0 Ton	30	60	0	150	45	180	
F-25,26,27	2013	Grass-clover pastur maint	3.0 Ton	30	60	0	150	45	180	
F-25,26,27	2014	Grass-clover pastur maint	3.0 Ton	30	60	0	150	45	180	
F-25,26,27	2015	Grass-clover pastur maint	3.0 Ton	30	60	0	150	45	180	
F-25,26,27	2016	Grass-clover pastur maint	3.0 Ton	30	60	0	150	45	180	
F-29	2012	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-29	2013	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-29	2014	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-29	2015	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-29	2016	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-30	2012	Grass-clover pastur maint	3.0 Ton	30	60	30	150	45	180	
F-30	2013	Grass-clover pastur maint	3.0 Ton	30	60	30	150	45	180	
F-30	2014	Grass-clover pastur maint	3.0 Ton	30	60	30	150	45	180	
F-30	2015	Grass-clover pastur maint	3.0 Ton	30	60	30	150	45	180	
F-30	2016	Grass-clover pastur maint	3.0 Ton	30	60	30	150	45	180	
F-33	2012	Fescue pasture maint	4.0 Ton	120	60	0	152	72	208	
F-33	2013	Fescue pasture maint	4.0 Ton	120	60	0	152	72	208	
F-33	2014	Fescue pasture maint	4.0 Ton	120	60	0	152	72	208	
F-33	2015	Fescue pasture maint	4.0 Ton	120	60	0	152	72	208	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
F-33	2016	Fescue pasture maint	4.0 Ton	120	60	0	152	72	208	
F-35	2012	Fescue pasture maint	4.0 Ton	120	60	30	152	72	208	
F-35	2013	Fescue pasture maint	4.0 Ton	120	60	30	152	72	208	
F-35	2014	Fescue pasture maint	4.0 Ton	120	60	30	152	72	208	
F-35	2015	Fescue pasture maint	4.0 Ton	120	60	30	152	72	208	
F-35	2016	Fescue pasture maint	4.0 Ton	120	60	30	152	72	208	
F-38A	2012	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38A	2013	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38A	2014	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38A	2015	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38A	2016	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38B	2012	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38B	2013	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38B	2014	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38B	2015	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
F-38B	2016	Grass-clover pastur maint	3.0 Ton	30	60	60	150	45	180	
North Fld	2012	Sm grain/leg/ryegrass hay*	7.0 Ton	105	40	40	196	70	210	
North Fld	2012	Corn silage	27.0 Ton	180	100	200	224	97	224	
North Fld	2013	Sm grain/leg/ryegrass hay*	7.0 Ton	105	40	40	196	70	210	
North Fld	2013	Corn silage	27.0 Ton	180	100	200	224	97	224	
North Fld	2014	Sm grain/leg/ryegrass hay*	7.0 Ton	105	40	40	196	70	210	
North Fld	2014	Corn silage	27.0 Ton	180	100	200	224	97	224	
North Fld	2015	Sm grain/leg/ryegrass hay*	7.0 Ton	105	40	40	196	70	210	
North Fld	2015	Corn silage	27.0 Ton	180	100	200	224	97	224	
North Fld	2016	Sm grain/leg/ryegrass hay*	7.0 Ton	105	40	40	196	70	210	
North Fld	2016	Corn silage	27.0 Ton	180	100	200	224	97	224	

*first crop in double-crop system-(hay =silage for planning purposes.).

^a Custom fertilizer recommendation.

6.6. Manure Application Planning Calendar – January 2012 through December 2012

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2012 Crop (Prev. Primary Crop)	Jan '12	Feb '12	Mar '12	Apr '12	May '12	Jun '12	Jul '12	Aug '12	Sep '12	Oct '12	Nov '12	Dec '12
B-4	26.6	26.5	Squatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									23.2			
B-6	21.4	21.4	Waynesboro L (WbB2 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									18.8			
F-1	35.9	35.4	Squatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2	36.2	36.2	Squatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2,3-hay	3.0	2.6	Squatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)				5.2								
F-3	8.8	8.2	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)												
F-4	12.8	12.1	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X								
F-5	27.7	27.7	Squatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)									13.9			
F-6	15.3	14.6	Waynesboro L (WbC2 5-12%)	Bermuda hybrid pasture (Bermuda hybrid pasture)												
F-6,7,8	35.9	34.6	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-7,8	21.6	20.4	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-9	38.9	37.9	Squatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-10	7.4	6.7	Squatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)				13.4								
F-10A	29.3	28.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-10B	13.3	13.3	Leadvale SIL (LeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-11,12	14.2	14.1	Waynesboro L (WbB2 2-5%)	Bermuda hybrid pasture (Bermuda hybrid pasture)												
F-13,14	10.5	10.5	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-15-18,36,37	35.1	35.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-19	76.3	75.4	Squatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-20	12.8	11.8	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)									23.6			
F-21,22	12.0	12.0	Squatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2012 Crop (Prev. Primary Crop)	Jan '12	Feb '12	Mar '12	Apr '12	May '12	Jun '12	Jul '12	Aug '12	Sep '12	Oct '12	Nov '12	Dec '12
F-23A	22.3	21.6	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-23B	22.0	20.6	Waynesboro L (WbB2 2-5%)	Corn silage (Corn silage)				X								
F-23-pasture	11.6	10.3	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-24	9.6	8.7	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-25,26,27	13.9	12.5	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-29	7.9	7.1	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-30	3.9	3.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-33	51.4	51.4	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-35	6.1	5.9	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-38A	13.3	13.3	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-38B	14.2	14.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
North Fld	65.2	65.2	Sequatchie L (Sa 2-5%)	Corn silage (Corn silage)				108.5								
<i>Total</i>	<i>736.4</i>	<i>719.2</i>							<i>127.1</i>					<i>55.9</i>	<i>23.6</i>	
Crop in field					No. indicates total loads "X" indicates other manure apps											

Manure Application Planning Calendar – January 2013 through December 2013

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2013 Crop (Prev. Primary Crop)	Jan '13	Feb '13	Mar '13	Apr '13	May '13	Jun '13	Jul '13	Aug '13	Sep '13	Oct '13	Nov '13	Dec '13
B-4	26.6	26.5	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									23.2			
B-6	21.4	21.4	Waynesboro L (WbB2 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									18.8			
F-1	35.9	35.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2	36.2	36.2	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2,3-hay	3.0	2.6	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)												
F-3	8.8	8.2	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)												
F-4	12.8	12.1	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X								
F-5	27.7	27.7	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-6	15.3	14.6	Waynesboro L (WbC2 5-12%)	Bermuda hybrid pasture (Bermuda hybrid pasture)												
F-6,7,8	35.9	34.6	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)									17.3			
F-7,8	21.6	20.4	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-9	38.9	37.9	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-10	7.4	6.7	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)					13.4							
F-10A	29.3	28.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-10B	13.3	13.3	Leadvale SIL (LeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)									6.7			
F-11,12	14.2	14.1	Waynesboro L (WbB2 2-5%)	Bermuda hybrid pasture (Bermuda hybrid pasture)												
F-13,14	10.5	10.5	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-15-18,36,37	35.1	35.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-19	76.3	75.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-20	12.8	11.8	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-21,22	12.0	12.0	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2013 Crop (Prev. Primary Crop)	Jan '13	Feb '13	Mar '13	Apr '13	May '13	Jun '13	Jul '13	Aug '13	Sep '13	Oct '13	Nov '13	Dec '13
F-23A	22.3	21.6	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-23B	22.0	20.6	Waynesboro L (WbB2 2-5%)	Corn silage (Corn silage)				X								
F-23-pasture	11.6	10.3	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-24	9.6	8.7	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)							13.1					
F-25,26,27	13.9	12.5	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)									18.8			
F-29	7.9	7.1	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)									3.6			
F-30	3.9	3.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-33	51.4	51.4	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-35	6.1	5.9	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-38A	13.3	13.3	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-38B	14.2	14.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
North Fld	65.2	65.2	Sequatchie L (Sa 2-5%)	Corn silage (Corn silage)				114.1								
<i>Total</i>	<i>736.4</i>	<i>719.2</i>						<i>127.5</i>	<i>X</i>		<i>13.1</i>		<i>88.4</i>	<i>X</i>		
Crop in field					No. indicates total loads "X" indicates other manure apps											

Manure Application Planning Calendar – January 2014 through December 2014

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2014 Crop (Prev. Primary Crop)	Jan '14	Feb '14	Mar '14	Apr '14	May '14	Jun '14	Jul '14	Aug '14	Sep '14	Oct '14	Nov '14	Dec '14
B-4	26.6	26.5	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									23.2			
B-6	21.4	21.4	Waynesboro L (WbB2 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									18.8			
F-1	35.9	35.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2	36.2	36.2	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2,3-hay	3.0	2.6	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)												
F-3	8.8	8.2	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X								
F-4	12.8	12.1	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X								
F-5	27.7	27.7	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)									13.9			
F-6	15.3	14.6	Waynesboro L (WbC2 5-12%)	Bermuda hybrid pasture (Bermuda hybrid pasture)												
F-6,7,8	35.9	34.6	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-7,8	21.6	20.4	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-9	38.9	37.9	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-10	7.4	6.7	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)			13.4									
F-10A	29.3	28.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-10B	13.3	13.3	Leadvale SIL (LeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)									6.7			
F-11,12	14.2	14.1	Waynesboro L (WbB2 2-5%)	Bermuda hybrid pasture (Bermuda hybrid pasture)												
F-13,14	10.5	10.5	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-15-18,36,37	35.1	35.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-19	76.3	75.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-20	12.8	11.8	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)								17.7				
F-21,22	12.0	12.0	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2014 Crop (Prev. Primary Crop)	Jan '14	Feb '14	Mar '14	Apr '14	May '14	Jun '14	Jul '14	Aug '14	Sep '14	Oct '14	Nov '14	Dec '14
F-23A	22.3	21.6	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-23B	22.0	20.6	Waynesboro L (WbB2 2-5%)	Corn silage (Corn silage)				X								
F-23-pasture	11.6	10.3	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-24	9.6	8.7	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-25,26,27	13.9	12.5	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)										18.4		
F-29	7.9	7.1	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-30	3.9	3.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-33	51.4	51.4	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)										X		
F-35	6.1	5.9	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)										X		
F-38A	13.3	13.3	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-38B	14.2	14.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
North Fld	65.2	65.2	Sequatchie L (Sa 2-5%)	Corn silage (Corn silage)					111.4							
<i>Total</i>	<i>736.4</i>	<i>719.2</i>						<i>13.4</i>	<i>111.4</i>			<i>17.7</i>		<i>81.0</i>		
Crop in field					No. indicates total loads "X" indicates other manure apps											

Manure Application Planning Calendar – January 2015 through December 2015

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2015 Crop (Prev. Primary Crop)	Jan '15	Feb '15	Mar '15	Apr '15	May '15	Jun '15	Jul '15	Aug '15	Sep '15	Oct '15	Nov '15	Dec '15	
B-4	26.6	26.5	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									23.2				
B-6	21.4	21.4	Waynesboro L (WbB2 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									18.8				
F-1	35.9	35.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X									
F-2	36.2	36.2	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X									
F-2,3-hay	3.0	2.6	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)			5.2										
F-3	8.8	8.2	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X									
F-4	12.8	12.1	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X									
F-5	27.7	27.7	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)													
F-6	15.3	14.6	Waynesboro L (WbC2 5-12%)	Bermuda hybrid pasture (Bermuda hybrid pasture)													
F-6,7,8	35.9	34.6	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)									17.3				
F-7,8	21.6	20.4	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)													
F-9	38.9	37.9	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X									
F-10	7.4	6.7	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)			13.4										
F-10A	29.3	28.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)													
F-10B	13.3	13.3	Leadvale SIL (LeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)													
F-11,12	14.2	14.1	Waynesboro L (WbB2 2-5%)	Bermuda hybrid pasture (Bermuda hybrid pasture)													
F-13,14	10.5	10.5	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)													
F-15-18,36,37	35.1	35.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)													
F-19	76.3	75.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X									
F-20	12.8	11.8	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)							17.7						
F-21,22	12.0	12.0	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)													

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2015 Crop (Prev. Primary Crop)	Jan '15	Feb '15	Mar '15	Apr '15	May '15	Jun '15	Jul '15	Aug '15	Sep '15	Oct '15	Nov '15	Dec '15
F-23A	22.3	21.6	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-23B	22.0	20.6	Waynesboro L (WbB2 2-5%)	Corn silage (Corn silage)				X								
F-23-pasture	11.6	10.3	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-24	9.6	8.7	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)									11.7			
F-25,26,27	13.9	12.5	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-29	7.9	7.1	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)									3.6			
F-30	3.9	3.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)									1.8			
F-33	51.4	51.4	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-35	6.1	5.9	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-38A	13.3	13.3	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)									6.7			
F-38B	14.2	14.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
North Fld	65.2	65.2	Sequatchie L (Sa 2-5%)	Corn silage (Corn silage)					112.9							
<i>Total</i>	<i>736.4</i>	<i>719.2</i>						<i>18.6</i>	<i>112.9</i>	<i>X</i>		<i>17.7</i>	<i>83.1</i>	<i>X</i>		
Crop in field					No. indicates total loads "X" indicates other manure apps											

Manure Application Planning Calendar – January 2016 through December 2016

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2016 Crop (Prev. Primary Crop)	Jan '16	Feb '16	Mar '16	Apr '16	May '16	Jun '16	Jul '16	Aug '16	Sep '16	Oct '16	Nov '16	Dec '16
B-4	26.6	26.5	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									23.2			
B-6	21.4	21.4	Waynesboro L (WbB2 2-5%)	Grass-clover hay maint (Grass-clover hay maint)									18.8			
F-1	35.9	35.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2	36.2	36.2	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-2,3-hay	3.0	2.6	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)												
F-3	8.8	8.2	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X								
F-4	12.8	12.1	Hamblen SIL (Ha 0-2%)	Corn silage (Corn silage)				X								
F-5	27.7	27.7	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-6	15.3	14.6	Waynesboro L (WbC2 5-12%)	Bermuda hybrid pasture (Bermuda hybrid pasture)									22.0			
F-6,7,8	35.9	34.6	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-7,8	21.6	20.4	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-9	38.9	37.9	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-10	7.4	6.7	Sequatchie SIL (SeB 2-5%)	Grass-clover hay maint (Grass-clover hay maint)			13.4									
F-10A	29.3	28.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-10B	13.3	13.3	Leadvale SIL (LeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-11,12	14.2	14.1	Waynesboro L (WbB2 2-5%)	Bermuda hybrid pasture (Bermuda hybrid pasture)												
F-13,14	10.5	10.5	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-15-18,36,37	35.1	35.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-19	76.3	75.4	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-20	12.8	11.8	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)									15.8			
F-21,22	12.0	12.0	Sequatchie SIL (SeB 2-5%)	Grass-clover pastur maint (Grass-clover pastur maint)												

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2016 Crop (Prev. Primary Crop)	Jan '16	Feb '16	Mar '16	Apr '16	May '16	Jun '16	Jul '16	Aug '16	Sep '16	Oct '16	Nov '16	Dec '16
F-23A	22.3	21.6	Sequatchie SIL (SeB 2-5%)	Corn silage (Corn silage)				X								
F-23B	22.0	20.6	Waynesboro L (WbB2 2-5%)	Corn silage (Corn silage)				X								
F-23-pasture	11.6	10.3	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-24	9.6	8.7	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-25,26,27	13.9	12.5	Hamblen SIL (Ha 0-2%)	Grass-clover pastur maint (Grass-clover pastur maint)								18.8				
F-29	7.9	7.1	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-30	3.9	3.5	Waynesboro L (WbC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-33	51.4	51.4	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-35	6.1	5.9	Waynesboro L (WbC2 5-12%)	Fescue pasture maint (Fescue pasture maint)									X			
F-38A	13.3	13.3	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
F-38B	14.2	14.1	Apison SIL (ApC2 5-12%)	Grass-clover pastur maint (Grass-clover pastur maint)												
North Fld	65.2	65.2	Sequatchie L (Sa 2-5%)	Corn silage (Corn silage)					104.1							
<i>Total</i>	<i>736.4</i>	<i>719.2</i>						<i>13.4</i>	<i>104.1</i>			<i>18.8</i>		<i>79.8</i>		
Crop in field					No. indicates total loads "X" indicates other manure apps											

6.7. Planned Nutrient Applications (Manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
B-4	Sep 2012	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	23.2 Lds	92.8 Ton	26.5	67	95	189
B-4	Sep 2013	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	23.2 Lds	92.8 Ton	26.5	67	95	189
B-4	Sep 2014	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	23.2 Lds	92.8 Ton	26.5	67	95	189
B-4	Sep 2015	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	23.2 Lds	92.8 Ton	26.5	67	95	189
B-4	Sep 2016	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	23.2 Lds	92.8 Ton	26.5	67	95	189
B-6	Sep 2012	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	18.8 Lds	75.2 Ton	21.5	67	95	189
B-6	Sep 2013	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	18.8 Lds	75.2 Ton	21.5	67	95	189
B-6	Sep 2014	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	18.8 Lds	75.2 Ton	21.5	67	95	189
B-6	Sep 2015	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	18.8 Lds	75.2 Ton	21.5	67	95	189
B-6	Sep 2016	Grass-clover hay maint	Dry pack	Knight-slinger, Not incorporated	Custom	3.5 Ton	18.8 Lds	75.2 Ton	21.5	67	95	189
F-1	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		7,080 Lbs	35.4	92	0	0
F-1	Apr 2012	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	601,800 Gal	35.4	162	77	184
F-1	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		319 Gal	35.4	27	0	0
F-1	Sep 2012	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	460,200 Gal	35.4	124	59	140
F-1	Apr 2013	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	601,800 Gal	35.4	162	77	184
F-1	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	460,200 Gal	35.4	124	59	140
F-1	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	601,800 Gal	35.4	162	77	184
F-1	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	460,200 Gal	35.4	124	59	140
F-1	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	601,800 Gal	35.4	162	77	184
F-1	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	460,200 Gal	35.4	124	59	140
F-1	Apr 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	601,800 Gal	35.4	162	77	184
F-1	Sep 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	460,200 Gal	35.4	124	59	140
F-2	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		7,240 Lbs	36.2	92	0	0
F-2	Apr 2012	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	615,400 Gal	36.2	162	77	184
F-2	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		326 Gal	36.2	27	0	0
F-2	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	120 Lbs		4,344 Lbs	36.2	55	0	0
F-2	Apr 2013	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	615,400 Gal	36.2	162	77	184
F-2	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	10 Gal		362 Gal	36.2	30	0	0
F-2	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	470,600 Gal	36.2	124	59	140
F-2	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	615,400 Gal	36.2	162	77	184

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-2	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	470,600 Gal	36.2	124	59	140
F-2	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	615,400 Gal	36.2	162	77	184
F-2	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	470,600 Gal	36.2	124	59	140
F-2	Apr 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	615,400 Gal	36.2	162	77	184
F-2	Sep 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	470,600 Gal	36.2	124	59	140
F-2,3-hay	Apr 2012	Grass-clover hay maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	5.2 Lds	20.8 Ton	2.6	21	18	22
F-2,3-hay	Mar 2015	Grass-clover hay maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	5.2 Lds	20.8 Ton	2.6	21	18	22
F-3	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		1,640 Lbs	8.2	92	0	0
F-3	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal		451 Gal	8.2	164	0	0
F-3	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		74 Gal	8.2	27	0	0
F-3	Sep 2012	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	106,600 Gal	8.2	124	59	140
F-3	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		1,640 Lbs	8.2	92	0	0
F-3	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	20 Gal		164 Gal	8.2	60	0	0
F-3	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	106,600 Gal	8.2	124	59	140
F-3	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	139,400 Gal	8.2	162	77	184
F-3	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	106,600 Gal	8.2	124	59	140
F-3	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	139,400 Gal	8.2	162	77	184
F-3	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	106,600 Gal	8.2	124	59	140
F-3	Apr 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	139,400 Gal	8.2	162	77	184
F-3	Sep 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	106,600 Gal	8.2	124	59	140
F-4	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		2,420 Lbs	12.1	92	0	0
F-4	Apr 2012	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	205,700 Gal	12.1	162	77	184
F-4	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		109 Gal	12.1	27	0	0
F-4	Sep 2012	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	157,300 Gal	12.1	124	59	140
F-4	Apr 2013	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	205,700 Gal	12.1	162	77	184
F-4	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	157,300 Gal	12.1	124	59	140
F-4	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	205,700 Gal	12.1	162	77	184
F-4	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	157,300 Gal	12.1	124	59	140
F-4	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	205,150 Gal	12.1	162	77	184
F-4	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	157,300 Gal	12.1	124	59	140
F-4	Apr 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	205,700 Gal	12.1	162	77	184
F-4	Sep 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	157,300 Gal	12.1	124	59	140

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-5	Sep 2012	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	13.9 Lds	55.6 Ton	27.8	38	54	108
F-5	Sep 2014	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	13.9 Lds	55.6 Ton	27.8	38	54	108
F-6	May 2012	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,920 Lbs	14.6	92	0	0
F-6	Aug 2012	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,650 Lbs	14.6	85	0	0
F-6	May 2013	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,920 Lbs	14.6	92	0	0
F-6	Aug 2013	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,650 Lbs	14.6	85	0	0
F-6	May 2014	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,920 Lbs	14.6	92	0	0
F-6	Aug 2014	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,650 Lbs	14.6	85	0	0
F-6	May 2015	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,920 Lbs	14.6	92	0	0
F-6	Aug 2015	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,650 Lbs	14.6	85	0	0
F-6	May 2016	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	100 Lbs		1,460 Lbs	14.6	46	0	0
F-6	Sep 2016	Bermuda hybrid pasture	Dry pack	Knight-slinger, Not incorporated	Custom	6 Ton	22 Lds	88 Ton	14.7	115	162	325
F-6,7,8	Sep 2013	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	17.3 Lds	69.2 Ton	34.6	38	54	108
F-6,7,8	Sep 2015	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	17.3 Lds	69.2 Ton	34.6	38	54	108
F-9	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		7,580 Lbs	37.9	92	0	0
F-9	Apr 2012	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	644,300 Gal	37.9	162	77	184
F-9	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		341 Gal	37.9	27	0	0
F-9	Sep 2012	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	492,700 Gal	37.9	124	59	140
F-9	Apr 2013	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	644,300 Gal	37.9	162	77	184
F-9	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	492,700 Gal	37.9	124	59	140
F-9	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	644,300 Gal	37.9	162	77	184
F-9	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	492,700 Gal	37.9	124	59	140
F-9	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	644,300 Gal	37.9	162	77	184
F-9	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	492,700 Gal	37.9	124	59	140
F-9	Apr 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	644,300 Gal	37.9	162	77	184
F-9	Sep 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	492,700 Gal	37.9	124	59	140
F-10	Apr 2012	Grass-clover hay maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	13.4 Lds	53.6 Ton	6.7	21	18	22
F-10	Apr 2013	Grass-clover hay maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	13.4 Lds	53.6 Ton	6.7	21	18	22
F-10	Mar 2014	Grass-clover hay maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	13.4 Lds	53.6 Ton	6.7	21	18	22
F-10	Mar 2015	Grass-clover hay maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	13.4 Lds	53.6 Ton	6.7	21	18	22
F-10	Mar 2016	Grass-clover hay maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	13.4 Lds	53.6 Ton	6.7	21	18	22
F-10B	Sep 2013	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	6.7 Lds	26.8 Ton	13.4	38	54	108

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-10B	Sep 2014	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	6.7 Lds	26.8 Ton	13.4	38	54	108
F-11,12	May 2012	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,820 Lbs	14.1	92	0	0
F-11,12	Aug 2012	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,525 Lbs	14.1	85	0	0
F-11,12	May 2013	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,820 Lbs	14.1	92	0	0
F-11,12	Aug 2013	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,525 Lbs	14.1	85	0	0
F-11,12	May 2014	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,820 Lbs	14.1	92	0	0
F-11,12	Aug 2014	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,525 Lbs	14.1	85	0	0
F-11,12	May 2015	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,820 Lbs	14.1	92	0	0
F-11,12	Aug 2015	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,525 Lbs	14.1	85	0	0
F-11,12	May 2016	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs		2,820 Lbs	14.1	92	0	0
F-11,12	Aug 2016	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs		3,525 Lbs	14.1	85	0	0
F-19	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		15,080 Lbs	75.4	92	0	0
F-19	Apr 2012	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	1,281,800 Gal	75.4	162	77	184
F-19	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		679 Gal	75.4	27	0	0
F-19	Sep 2012	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	980,200 Gal	75.4	124	59	140
F-19	Apr 2013	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	1,281,800 Gal	75.4	162	77	184
F-19	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	12,500 Gal	2 mph	942,500 Gal	75.4	119	56	135
F-19	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	1,281,800 Gal	75.4	162	77	184
F-19	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	980,200 Gal	75.4	124	59	140
F-19	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	1,281,800 Gal	75.4	162	77	184
F-19	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	980,200 Gal	75.4	124	59	140
F-19	Apr 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	1,281,800 Gal	75.4	162	77	184
F-19	Sep 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	980,200 Gal	75.4	124	59	140
F-20	Oct 2012	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	8 Ton	23.6 Lds	94.4 Ton	11.8	21	18	22
F-20	Jul 2014	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	17.7 Lds	70.8 Ton	11.8	16	14	16
F-20	Jul 2015	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	17.7 Lds	70.8 Ton	11.8	16	14	16
F-20	Sep 2016	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	15.8 Lds	63.2 Ton	10.5	16	14	16
F-23A	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		4,320 Lbs	21.6	92	0	0
F-23A	Apr 2012	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	367,200 Gal	21.6	162	77	184
F-23A	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		194 Gal	21.6	27	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-23A	Sep 2012	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	280,800 Gal	21.6	124	59	140
F-23A	Apr 2013	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	367,200 Gal	21.6	162	77	184
F-23A	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	12,500 Gal	2 mph	270,000 Gal	21.6	119	56	135
F-23A	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	367,200 Gal	21.6	162	77	184
F-23A	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	280,800 Gal	21.6	124	59	140
F-23A	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	367,200 Gal	21.6	162	77	184
F-23A	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	280,800 Gal	21.6	124	59	140
F-23A	Apr 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	367,200 Gal	21.6	162	77	184
F-23A	Sep 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	280,800 Gal	21.6	124	59	140
F-23B	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		4,120 Lbs	20.6	92	0	0
F-23B	Apr 2012	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	350,200 Gal	20.6	162	77	184
F-23B	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal		185 Gal	20.6	27	0	0
F-23B	Sep 2012	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	12,500 Gal	2 mph	257,500 Gal	20.6	119	56	135
F-23B	Apr 2013	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	350,200 Gal	20.6	162	77	184
F-23B	Sep 2013	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	12,500 Gal	2 mph	257,500 Gal	20.6	119	56	135
F-23B	Apr 2014	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	350,200 Gal	20.6	162	77	184
F-23B	Sep 2014	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	267,800 Gal	20.6	124	59	140
F-23B	Apr 2015	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	350,200 Gal	20.6	162	77	184
F-23B	Sep 2015	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	267,800 Gal	20.6	124	59	140
F-23B	Apr 2016	Corn Silage	Storage pond	Umbilical-system, Not incorporated	Custom	17,000 Gal	1.5 mph	350,200 Gal	20.6	162	77	184
F-23B	Sep 2016	Sm grain/leg/ryegrass hay	Storage pond	Umbilical-system, Not incorporated	Custom	13,000 Gal	1.9 mph	267,800 Gal	20.6	124	59	140
F-24	Jul 2013	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	13.1 Lds	52.4 Ton	8.7	16	14	16
F-24	Sep 2015	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	11.7 Lds	46.8 Ton	7.8	16	14	16
F-25,26,27	Sep 2013	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	18.8 Lds	75.2 Ton	12.5	16	14	16
F-25,26,27	Sep 2014	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	18.4 Lds	73.6 Ton	12.3	16	14	16
F-25,26,27	Jul 2016	Grass-clover pastur maint	calf barn	Knight-slinger, Not incorporated	Custom	6 Ton	18.8 Lds	75.2 Ton	12.5	16	14	16
F-29	Sep 2013	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	3.6 Lds	14.4 Ton	7.2	38	54	108
F-29	Sep 2015	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	3.6 Lds	14.4 Ton	7.2	38	54	108
F-30	Sep 2015	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	1.8 Lds	7.2 Ton	3.6	38	54	108
F-33	Sep 2012	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	642,500 Gal	49.4	124	59	140

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-33	Sep 2013	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	668,200 Gal	51.4	124	59	140
F-33	Sep 2014	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	668,200 Gal	51.4	124	59	140
F-33	Sep 2015	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	668,200 Gal	51.4	124	59	140
F-33	Sep 2016	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	668,200 Gal	51.4	124	59	140
F-35	Sep 2012	Fescue pasture maint	Storage pond	traveling gun	Custom	12,000 Gal	581 Ft/Hr	70,800 Gal	5.9	114	54	130
F-35	Sep 2013	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	76,700 Gal	5.9	124	59	140
F-35	Sep 2014	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	76,700 Gal	5.9	124	59	140
F-35	Sep 2015	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	76,700 Gal	5.9	124	59	140
F-35	Sep 2016	Fescue pasture maint	Storage pond	traveling gun	Custom	13,000 Gal	536 Ft/Hr	76,700 Gal	5.9	124	59	140
F-38A	Sep 2015	Grass-clover pastur maint	Dry pack	Knight-slinger, Not incorporated	Custom	2 Ton	6.7 Lds	26.8 Ton	13.4	38	54	108
North Fld	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		13,040 Lbs	65.2	92	0	0
North Fld	Apr 2012	Corn Silage	Dry pack	Knight-slinger, incorp. w/in 1 day(s)	Custom	7 Ton	108.5 Lds	434 Ton	62.0	134	189	379
North Fld	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	20 Gal		1,304 Gal	65.2	60	0	0
North Fld	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		13,040 Lbs	65.2	92	0	0
North Fld	Apr 2013	Corn Silage	Dry pack	Knight-slinger, Not incorporated	Custom	7 Ton	114.1 Lds	456.4 Ton	65.2	134	189	379
North Fld	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		13,040 Lbs	65.2	92	0	0
North Fld	Apr 2014	Corn Silage	Dry pack	Knight-slinger, Not incorporated	Custom	7 Ton	111.4 Lds	445.6 Ton	63.7	134	189	379
North Fld	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		13,040 Lbs	65.2	92	0	0
North Fld	Apr 2015	Corn Silage	Dry pack	Knight-slinger, Not incorporated	Custom	7 Ton	112.9 Lds	451.6 Ton	64.5	134	189	379
North Fld	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs		13,040 Lbs	65.2	92	0	0
North Fld	Apr 2016	Corn Silage	Dry pack	Knight-slinger, Not incorporated	Custom	7 Ton	104.1 Lds	416.4 Ton	59.5	134	189	379

Planned Nutrient Applications (Non-manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-1	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	100 Lbs	0.5	92	0	0
F-1	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	28 Gal	0.5	164	0	0
F-1	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal	5 Gal	0.5	27	0	0
F-1	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	100 Lbs	0.5	92	0	0
F-1	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	28 Gal	0.5	164	0	0
F-1	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	100 Lbs	0.5	92	0	0
F-1	May 2014	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	28 Gal	0.5	164	0	0
F-1	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	100 Lbs	0.5	92	0	0
F-1	May 2015	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	28 Gal	0.5	164	0	0
F-1	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	120 Lbs	60 Lbs	0.5	55	0	0
F-1	May 2016	Corn Silage	28-0-0	Surface broadcast	Custom	60 Gal	30 Gal	0.5	179	0	0
F-3	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	120 Lbs	0.6	92	0	0
F-3	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal	5 Gal	0.6	27	0	0
F-3	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	33 Gal	0.6	164	0	0
F-3	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	120 Lbs	0.6	92	0	0
F-3	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	60 Gal	36 Gal	0.6	179	0	0
F-3	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	120 Lbs	0.6	92	0	0
F-3	May 2014	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	33 Gal	0.6	164	0	0
F-3	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	120 Lbs	0.6	92	0	0
F-3	May 2015	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	33 Gal	0.6	164	0	0
F-3	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	120 Lbs	72 Lbs	0.6	55	0	0
F-3	May 2016	Corn Silage	28-0-0	Surface broadcast	Custom	60 Gal	36 Gal	0.6	179	0	0
F-4	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-4	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0
F-4	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal	6 Gal	0.7	27	0	0
F-4	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	120 Lbs	84 Lbs	0.7	55	0	0
F-4	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	60 Gal	42 Gal	0.7	179	0	0
F-4	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-4	May 2014	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0
F-4	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-4	May 2015	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-4	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	120 Lbs	84 Lbs	0.7	55	0	0
F-4	May 2016	Corn Silage	28-0-0	Surface broadcast	Custom	60 Gal	42 Gal	0.7	179	0	0
F-6	May 2012	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-6	Aug 2012	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	175 Lbs	0.7	85	0	0
F-6	May 2013	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-6	Aug 2013	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	175 Lbs	0.7	85	0	0
F-6	May 2014	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-6	Aug 2014	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	175 Lbs	0.7	85	0	0
F-6	May 2015	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-6	Aug 2015	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	175 Lbs	0.7	85	0	0
F-6	May 2016	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-6	Aug 2016	Bermuda hybrid pasture	32-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	64	0	0
F-9	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	200 Lbs	1.0	92	0	0
F-9	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal	9 Gal	1.0	27	0	0
F-9	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	55 Gal	1.0	164	0	0
F-9	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	200 Lbs	1.0	92	0	0
F-9	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	60 Gal	60 Gal	1.0	179	0	0
F-9	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	200 Lbs	1.0	92	0	0
F-9	May 2014	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	55 Gal	1.0	164	0	0
F-9	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	200 Lbs	1.0	92	0	0
F-9	May 2015	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	55 Gal	1.0	164	0	0
F-9	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	200 Lbs	1.0	92	0	0
F-9	May 2016	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	55 Gal	1.0	164	0	0
F-11,12	May 2012	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	20 Lbs	0.1	92	0	0
F-11,12	Aug 2012	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	25 Lbs	0.1	85	0	0
F-11,12	May 2013	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	20 Lbs	0.1	92	0	0
F-11,12	Aug 2013	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	25 Lbs	0.1	85	0	0
F-11,12	May 2014	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	20 Lbs	0.1	92	0	0
F-11,12	Aug 2014	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	25 Lbs	0.1	85	0	0
F-11,12	May 2015	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	20 Lbs	0.1	92	0	0
F-11,12	Aug 2015	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	25 Lbs	0.1	85	0	0
F-11,12	May 2016	Bermuda hybrid pasture	46-0-0	Surface broadcast	Custom	200 Lbs	20 Lbs	0.1	92	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-11,12	Aug 2016	Bermuda hybrid pasture	34-0-0	Surface broadcast	Custom	250 Lbs	25 Lbs	0.1	85	0	0
F-19	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	180 Lbs	0.9	92	0	0
F-19	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	50 Gal	0.9	164	0	0
F-19	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal	8 Gal	0.9	27	0	0
F-19	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	180 Lbs	0.9	92	0	0
F-19	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	50 Gal	0.9	164	0	0
F-19	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	180 Lbs	0.9	92	0	0
F-19	May 2014	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	50 Gal	0.9	164	0	0
F-19	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	180 Lbs	0.9	92	0	0
F-19	May 2015	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	50 Gal	0.9	164	0	0
F-19	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	180 Lbs	0.9	92	0	0
F-19	May 2016	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	50 Gal	0.9	164	0	0
F-23A	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-23A	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0
F-23A	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal	6 Gal	0.7	27	0	0
F-23A	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-23A	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0
F-23A	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-23A	May 2014	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0
F-23A	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-23A	May 2015	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0
F-23A	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	140 Lbs	0.7	92	0	0
F-23A	May 2016	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	38 Gal	0.7	164	0	0
F-23B	Mar 2012	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	280 Lbs	1.4	92	0	0
F-23B	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	77 Gal	1.4	164	0	0
F-23B	May 2012	Corn Silage	28-0-0	Surface broadcast	Custom	9 Gal	13 Gal	1.4	27	0	0
F-23B	Mar 2013	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	280 Lbs	1.4	92	0	0
F-23B	May 2013	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	77 Gal	1.4	164	0	0
F-23B	Mar 2014	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	280 Lbs	1.4	92	0	0
F-23B	May 2014	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	77 Gal	1.4	164	0	0
F-23B	Mar 2015	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	280 Lbs	1.4	92	0	0
F-23B	May 2015	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	77 Gal	1.4	164	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
F-23B	Mar 2016	Sm grain/leg/ryegrass hay	46-0-0	Surface broadcast	Custom	200 Lbs	280 Lbs	1.4	92	0	0
F-23B	May 2016	Corn Silage	28-0-0	Surface broadcast	Custom	55 Gal	77 Gal	1.4	164	0	0
F-35	May 2012	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	Sep 2012	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	May 2013	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	Sep 2013	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	May 2014	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	Sep 2014	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	May 2015	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	Sep 2015	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	May 2016	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0
F-35	Sep 2016	Fescue pasture maint	46-0-0	Surface broadcast	Custom	125 Lbs	25 Lbs	0.2	58	0	0

6.8. Field Nutrient Balance (Manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2012	B-4	26.5	Grass-clover hay maint	4	60	60	60	67	95	189	7	35	129	35	-51
2013	B-4	26.5	Grass-clover hay maint	4	60	60	60	67	95	189	29†	70	258	70	-51
2014	B-4	26.5	Grass-clover hay maint	4	60	60	60	67	95	189	37†	105	387	105	-51
2015	B-4	26.5	Grass-clover hay maint	4	60	60	60	67	95	189	37†	140	516	140	-51
2016	B-4	26.5	Grass-clover hay maint	4	60	60	60	67	95	189	37†	175	645	175	-51
Total	B-4				300	300	300	335	475	945					
2012	B-6	21.4	Grass-clover hay maint	4	60	60	30	67	95	190	7	35	160	35	-50
2013	B-6	21.4	Grass-clover hay maint	4	60	60	30	67	95	190	29†	70	320	70	-50
2014	B-6	21.4	Grass-clover hay maint	4	60	60	30	67	95	190	37†	105	480	105	-50
2015	B-6	21.4	Grass-clover hay maint	4	60	60	30	67	95	190	37†	140	640	140	-50
2016	B-6	21.4	Grass-clover hay maint	4	60	60	30	67	95	190	37†	175	800	175	-50
Total	B-6				300	300	150	335	475	950					
2012	F-1	35.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-1	35.4	Corn silage	27	180	0	0	281	77	184	-4	77	184	-90	-250
2013	F-1	35.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-1	35.4	Corn silage	27	180	0	0	286	136	324	33†	213	508	-31	-110
2014	F-1	35.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-1	35.4	Corn silage	27	180	0	0	286	136	324	70†	349	832	-31	-110
2015	F-1	35.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-1	35.4	Corn silage	27	180	0	0	286	136	324	79†	485	1,156	-31	-110
2016	F-1	35.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-1	35.4	Corn silage	27	180	0	0	286	136	324	79†	621	1,480	-31	-110
Total	F-1				1425	0	0	1425	621	1480					
2012	F-2	36.2	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-2	36.2	Corn silage	27	180	0	0	281	77	184	-4	77	184	-90	-250
2013	F-2	36.2	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-2	36.2	Corn silage	27	180	0	0	247	77	184	-6†	154	368	-90	-250
2014	F-2	36.2	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-2	36.2	Corn silage	27	180	0	0	286	136	324	45†	290	692	-31	-110
2015	F-2	36.2	Sm grain/leg/ryegrass hay	7	105	0	0								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2015	F-2	36.2	Corn silage	27	180	0	0	286	136	324	70†	426	1,016	-31	-110
2016	F-2	36.2	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-2	36.2	Corn silage	27	180	0	0	286	136	324	79†	562	1,340	-31	-110
Total	F-2				1425	0	0	1386	562	1340					
2012	F-2,3-hay	2.6	Grass-clover hay maint	4	60	0	0	21	18	22	-39	18	22	-42	-218
2013	F-2,3-hay	2.6	Grass-clover hay maint	4	60	0	0	0	0	0	-54†	18	22	-60	-240
2014	F-2,3-hay	2.6	Grass-clover hay maint	4	60	0	0	0	0	0	-58†	18	22	-60	-240
2015	F-2,3-hay	2.6	Grass-clover hay maint	4	60	0	0	21	18	22	-39	36	44	-42	-218
2016	F-2,3-hay	2.6	Grass-clover hay maint	4	60	0	0	0	0	0	-54†	36	44	-60	-240
Total	F-2,3-hay				300	0	0	42	36	44					
2012	F-3	8.2	Sm grain/leg/ryegrass hay	7	105	80	80								
2012	F-3	8.2	Corn silage	27	180	200	300	283	0	0	-2	-280	-380	-167	-434
2013	F-3	8.2	Sm grain/leg/ryegrass hay	7	105	80	80								
2013	F-3	8.2	Corn silage	27	180	200	300	276	59	140	-9	-221	-240	-108	-294
2014	F-3	8.2	Sm grain/leg/ryegrass hay	7	105	80	80								
2014	F-3	8.2	Corn silage	27	180	200	300	286	136	324	26†	-144	-56	-31	-110
2015	F-3	8.2	Sm grain/leg/ryegrass hay	7	105	80	80								
2015	F-3	8.2	Corn silage	27	180	200	300	286	136	324	67†	-144	-56	-31	-110
2016	F-3	8.2	Sm grain/leg/ryegrass hay	7	105	80	80								
2016	F-3	8.2	Corn silage	27	180	200	300	286	136	324	79†	-144	-56	-31	-110
Total	F-3				1425	1400	1900	1417	467	1112					
2012	F-4	12.1	Sm grain/leg/ryegrass hay	7	105	80	80								
2012	F-4	12.1	Corn silage	27	180	200	300	281	77	184	-4	-203	-196	-90	-250
2013	F-4	12.1	Sm grain/leg/ryegrass hay	7	105	80	80								
2013	F-4	12.1	Corn silage	27	180	200	300	286	136	324	33†	-144	-56	-31	-110
2014	F-4	12.1	Sm grain/leg/ryegrass hay	7	105	80	80								
2014	F-4	12.1	Corn silage	27	180	200	300	286	136	324	70†	-144	-56	-31	-110
2015	F-4	12.1	Sm grain/leg/ryegrass hay	7	105	80	80								
2015	F-4	12.1	Corn silage	27	180	200	300	286	136	324	79†	-144	-56	-31	-110
2016	F-4	12.1	Sm grain/leg/ryegrass hay	7	105	80	80								
2016	F-4	12.1	Corn silage	27	180	200	300	286	136	324	79†	-144	-56	-31	-110

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
Total	F-4			/Acre	1425	1400	1900	1425	621	1480					
2012	F-5	27.7	Grass-clover pastur maint	4	30	30	30	38	54	108	8	24	78	-6	-132
2013	F-5	27.7	Grass-clover pastur maint	4	30	30	30	0	0	0	-18†	-6	48	-60	-240
2014	F-5	27.7	Grass-clover pastur maint	4	30	30	30	38	54	108	13†	24	126	-6	-132
2015	F-5	27.7	Grass-clover pastur maint	4	30	30	30	0	0	0	-18†	-6	96	-60	-240
2016	F-5	27.7	Grass-clover pastur maint	4	30	30	30	0	0	0	-25†	-30	66	-60	-240
Total	F-5				150	150	150	76	108	216					
2012	F-6	14.6	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2013	F-6	14.6	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2014	F-6	14.6	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2015	F-6	14.6	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2016	F-6	14.6	Bermuda hybrid pasture	6	180	0	0	162	163	327	-18	163	327	91	27
Total	F-6				900	0	0	870	163	327					
2012	F-6,7,8	34.6	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-6,7,8	34.6	Grass-clover pastur maint	3	30	60	60	38	54	108	8	-6	48	9	-72
2014	F-6,7,8	34.6	Grass-clover pastur maint	3	30	60	60	0	0	0	-18†	-60	-12	-36	-180
2015	F-6,7,8	34.6	Grass-clover pastur maint	3	30	60	60	38	54	108	13†	-6	48	9	-72
2016	F-6,7,8	34.6	Grass-clover pastur maint	3	30	60	60	0	0	0	-18†	-60	-12	-36	-180
Total	F-6,7,8				150	300	300	76	108	216					
2012	F-7,8	20.4	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2013	F-7,8	20.4	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2014	F-7,8	20.4	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2015	F-7,8	20.4	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2016	F-7,8	20.4	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
Total	F-7,8				150	0	300	0	0	0					
2012	F-9	37.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-9	37.9	Corn silage	27	180	0	0	281	77	184	-4	77	184	-90	-250
2013	F-9	37.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-9	37.9	Corn silage	27	180	0	0	286	136	324	33†	213	508	-31	-110
2014	F-9	37.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-9	37.9	Corn silage	27	180	0	0	286	136	324	70†	349	832	-31	-110

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2015	F-9	37.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-9	37.9	Corn silage	27	180	0	0	286	136	324	79†	485	1,156	-31	-110
2016	F-9	37.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-9	37.9	Corn silage	27	180	0	0	286	136	324	79†	621	1,480	-31	-110
Total	F-9				1425	0	0	1425	621	1480					
2012	F-10	6.7	Grass-clover hay maint	4	60	60	60	21	18	22	-39	-42	-38	-42	-218
2013	F-10	6.7	Grass-clover hay maint	4	60	60	60	21	18	22	-33†	-42	-38	-42	-218
2014	F-10	6.7	Grass-clover hay maint	4	60	60	60	21	18	22	-31†	-42	-38	-42	-218
2015	F-10	6.7	Grass-clover hay maint	4	60	60	60	21	18	22	-31†	-42	-38	-42	-218
2016	F-10	6.7	Grass-clover hay maint	4	60	60	60	21	18	22	-31†	-42	-38	-42	-218
Total	F-10				300	300	300	105	90	110					
2012	F-10A	28.5	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2013	F-10A	28.5	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2014	F-10A	28.5	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2015	F-10A	28.5	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2016	F-10A	28.5	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
Total	F-10A				150	0	0	0	0	0					
2012	F-10B	13.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-10B	13.3	Grass-clover pastur maint	3	30	60	60	38	54	109	8	-6	49	9	-71
2014	F-10B	13.3	Grass-clover pastur maint	3	30	60	60	38	54	109	20†	-6	98	18	-71
2015	F-10B	13.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-13†	-60	38	-27	-180
2016	F-10B	13.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-25†	-60	-22	-45	-180
Total	F-10B				150	300	300	76	108	218					
2012	F-11,12	14.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2013	F-11,12	14.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2014	F-11,12	14.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2015	F-11,12	14.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2016	F-11,12	14.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
Total	F-11,12				900	0	0	885	0	0					
2012	F-13,14	10.5	Grass-clover pastur maint	3	30	30	30	0	0	0	-30	-30	-30	-45	-180
2013	F-13,14	10.5	Grass-clover pastur maint	3	30	30	30	0	0	0	-30	-30	-30	-45	-180

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2014	F-13,14	10.5	Grass-clover pastur maint	3	30	30	30	0	0	0	-30	-30	-30	-45	-180
2015	F-13,14	10.5	Grass-clover pastur maint	3	30	30	30	0	0	0	-30	-30	-30	-45	-180
2016	F-13,14	10.5	Grass-clover pastur maint	3	30	30	30	0	0	0	-30	-30	-30	-45	-180
Total	F-13,14				150	150	150	0	0	0					
2012	F-15-18,36,37	35.1	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2013	F-15-18,36,37	35.1	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2014	F-15-18,36,37	35.1	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2015	F-15-18,36,37	35.1	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2016	F-15-18,36,37	35.1	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
Total	F-15-18,36,37				150	0	300	0	0	0					
2012	F-19	75.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-19	75.4	Corn silage	27	180	0	0	281	77	184	-4	77	184	-90	-250
2013	F-19	75.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-19	75.4	Corn silage	27	180	0	0	286	136	324	33†	213	508	-31	-110
2014	F-19	75.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-19	75.4	Corn silage	27	180	0	0	281	133	319	65†	346	827	-34	-115
2015	F-19	75.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-19	75.4	Corn silage	27	180	0	0	286	136	324	78†	482	1,151	-31	-110
2016	F-19	75.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-19	75.4	Corn silage	27	180	0	0	286	136	324	79†	618	1,475	-31	-110
Total	F-19				1425	0	0	1420	618	1475					
2012	F-20	11.8	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-20	11.8	Grass-clover pastur maint	3	30	60	60	21	18	22	-9	-42	-38	-27	-158
2014	F-20	11.8	Grass-clover pastur maint	3	30	60	60	16	14	16	-8†	-46	-44	-31	-164
2015	F-20	11.8	Grass-clover pastur maint	3	30	60	60	16	14	16	-8†	-46	-44	-31	-164
2016	F-20	11.8	Grass-clover pastur maint	3	30	60	60	14	12	14	-10†	-48	-46	-33	-166
Total	F-20				150	300	300	67	58	68					
2012	F-21,22	12.0	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
2013	F-21,22	12.0	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
2014	F-21,22	12.0	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
2015	F-21,22	12.0	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴		
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	
2016	F-21,22	12.0	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180	
Total	F-21,22				150	150	0	0	0	0						
2012	F-23A	21.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2012	F-23A	21.6	Corn silage	27	180	0	0	281	77	184	-4	77	184	-90	-250	
2013	F-23A	21.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2013	F-23A	21.6	Corn silage	27	180	0	0	286	136	324	33†	213	508	-31	-110	
2014	F-23A	21.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2014	F-23A	21.6	Corn silage	27	180	0	0	281	133	319	65†	346	827	-34	-115	
2015	F-23A	21.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2015	F-23A	21.6	Corn silage	27	180	0	0	286	136	324	78†	482	1,151	-31	-110	
2016	F-23A	21.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2016	F-23A	21.6	Corn silage	27	180	0	0	286	136	324	79†	618	1,475	-31	-110	
Total	F-23A				1425	0	0	1420	618	1475						
2012	F-23B	20.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2012	F-23B	20.6	Corn silage	27	180	0	0	281	77	184	-4	77	184	-90	-250	
2013	F-23B	20.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2013	F-23B	20.6	Corn silage	27	180	0	0	281	133	319	28†	210	503	-34	-115	
2014	F-23B	20.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2014	F-23B	20.6	Corn silage	27	180	0	0	281	133	319	64†	343	822	-34	-115	
2015	F-23B	20.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2015	F-23B	20.6	Corn silage	27	180	0	0	286	136	324	78†	479	1,146	-31	-110	
2016	F-23B	20.6	Sm grain/leg/ryegrass hay	7	105	0	0									
2016	F-23B	20.6	Corn silage	27	180	0	0	286	136	324	79†	615	1,470	-31	-110	
Total	F-23B				1425	0	0	1415	615	1470						
2012	F-23-pasture	10.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180	
2013	F-23-pasture	10.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180	
2014	F-23-pasture	10.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180	
2015	F-23-pasture	10.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180	
2016	F-23-pasture	10.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180	
Total	F-23-pasture				150	150	0	0	0	0						
2012	F-24	8.7	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180	

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2013	F-24	8.7	Grass-clover pastur maint	3	30	60	60	16	14	16	-14	-46	-44	-31	-164
2014	F-24	8.7	Grass-clover pastur maint	3	30	60	60	0	0	0	-26†	-60	-60	-45	-180
2015	F-24	8.7	Grass-clover pastur maint	3	30	60	60	14	13	14	-14†	-47	-46	-32	-166
2016	F-24	8.7	Grass-clover pastur maint	3	30	60	60	0	0	0	-26†	-60	-60	-45	-180
Total	F-24				150	300	300	30	27	30					
2012	F-25,26,27	12.5	Grass-clover pastur maint	3	30	60	0	0	0	0	-30	-60	0	-45	-180
2013	F-25,26,27	12.5	Grass-clover pastur maint	3	30	60	0	16	14	16	-14	-46	16	-31	-164
2014	F-25,26,27	12.5	Grass-clover pastur maint	3	30	60	0	16	14	16	-10†	-46	32	-31	-164
2015	F-25,26,27	12.5	Grass-clover pastur maint	3	30	60	0	0	0	0	-24†	-60	32	-45	-180
2016	F-25,26,27	12.5	Grass-clover pastur maint	3	30	60	0	16	14	16	-12†	-46	48	-31	-164
Total	F-25,26,27				150	300	0	48	42	48					
2012	F-29	7.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-29	7.1	Grass-clover pastur maint	3	30	60	60	39	55	110	9	-5	50	10	-70
2014	F-29	7.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-18†	-60	-10	-35	-180
2015	F-29	7.1	Grass-clover pastur maint	3	30	60	60	39	55	110	14†	-5	50	10	-70
2016	F-29	7.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-18†	-60	-10	-35	-180
Total	F-29				150	300	300	78	110	220					
2012	F-30	3.5	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
2013	F-30	3.5	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
2014	F-30	3.5	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
2015	F-30	3.5	Grass-clover pastur maint	3	30	60	30	39	55	111	9	-5	81	10	-69
2016	F-30	3.5	Grass-clover pastur maint	3	30	60	30	0	0	0	-18†	-60	51	-35	-180
Total	F-30				150	300	150	39	55	111					
2012	F-33	51.4	Fescue pasture maint	4	120	60	0	119	57	135	-1	-3	135	-15	-73
2013	F-33	51.4	Fescue pasture maint	4	120	60	0	124	59	140	28†	-1	275	-13	-68
2014	F-33	51.4	Fescue pasture maint	4	120	60	0	124	59	140	38†	-1	415	-13	-68
2015	F-33	51.4	Fescue pasture maint	4	120	60	0	124	59	140	38†	-1	555	-13	-68
2016	F-33	51.4	Fescue pasture maint	4	120	60	0	124	59	140	38†	-1	695	-13	-68
Total	F-33				600	300	0	615	293	695					
2012	F-35	5.9	Fescue pasture maint	4	120	60	30	114	54	130	-6	-6	100	-18	-78
2013	F-35	5.9	Fescue pasture maint	4	120	60	30	124	59	140	27†	-1	210	-13	-68

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2014	F-35	5.9	Fescue pasture maint	4	120	60	30	124	59	140	37†	-1	320	-13	-68
2015	F-35	5.9	Fescue pasture maint	4	120	60	30	124	59	140	38†	-1	430	-13	-68
2016	F-35	5.9	Fescue pasture maint	4	120	60	30	124	59	140	38†	-1	540	-13	-68
Total	F-35				600	300	150	610	290	690					
2012	F-38A	13.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-38A	13.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2014	F-38A	13.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2015	F-38A	13.3	Grass-clover pastur maint	3	30	60	60	38	54	109	8	-6	49	9	-71
2016	F-38A	13.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-18†	-60	-11	-36	-180
Total	F-38A				150	300	300	38	54	109					
2012	F-38B	14.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-38B	14.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2014	F-38B	14.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2015	F-38B	14.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2016	F-38B	14.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
Total	F-38B				150	300	300	0	0	0					
2012	North Fld	65.2	Sm grain/leg/ryegrass hay	7	105	40	40								
2012	North Fld	65.2	Corn silage	27	180	100	200	279	180	360	-6	40	120	13	-74
2013	North Fld	65.2	Sm grain/leg/ryegrass hay	7	105	40	40								
2013	North Fld	65.2	Corn silage	27	180	100	200	226	189	379	-18†	89	259	35	-55
2014	North Fld	65.2	Sm grain/leg/ryegrass hay	7	105	40	40								
2014	North Fld	65.2	Corn silage	27	180	100	200	223	185	370	-3†	134	389	53	-64
2015	North Fld	65.2	Sm grain/leg/ryegrass hay	7	105	40	40								
2015	North Fld	65.2	Corn silage	27	180	100	200	225	187	375	-1†	181	524	73	-59
2016	North Fld	65.2	Sm grain/leg/ryegrass hay	7	105	40	40								
2016	North Fld	65.2	Corn silage	27	180	100	200	214	172	346	-11†	213	630	78	-88
Total	North Fld				1425	700	1200	1167	913	1830					

Field Nutrient Balance (Non-manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal /Acre	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2012	B-4	0.1	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2013	B-4	0.1	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2014	B-4	0.1	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2015	B-4	0.1	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2016	B-4	0.1	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
Total	B-4				300	300	300	0	0	0					
2012	F-1	0.5	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-1	0.5	Corn silage	27	180	0	0	283	0	0	-2	0	0	-167	-434
2013	F-1	0.5	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-1	0.5	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2014	F-1	0.5	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-1	0.5	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2015	F-1	0.5	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-1	0.5	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2016	F-1	0.5	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-1	0.5	Corn silage	27	180	0	0	234	0	0	-51	0	0	-167	-434
Total	F-1				1425	0	0	1285	0	0					
2012	F-2,3-hay	0.4	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2013	F-2,3-hay	0.4	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2014	F-2,3-hay	0.4	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2015	F-2,3-hay	0.4	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2016	F-2,3-hay	0.4	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
Total	F-2,3-hay				300	0	0	0	0	0					
2012	F-3	0.6	Sm grain/leg/ryegrass hay	7	105	80	80								
2012	F-3	0.6	Corn silage	27	180	200	300	283	0	0	-2	-280	-380	-167	-434
2013	F-3	0.6	Sm grain/leg/ryegrass hay	7	105	80	80								
2013	F-3	0.6	Corn silage	27	180	200	300	271	0	0	-14	-280	-380	-167	-434
2014	F-3	0.6	Sm grain/leg/ryegrass hay	7	105	80	80								
2014	F-3	0.6	Corn silage	27	180	200	300	256	0	0	-29	-280	-380	-167	-434
2015	F-3	0.6	Sm grain/leg/ryegrass hay	7	105	80	80								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2015	F-3	0.6	Corn silage	27	180	200	300	256	0	0	-29	-280	-380	-167	-434
2016	F-3	0.6	Sm grain/leg/ryegrass hay	7	105	80	80								
2016	F-3	0.6	Corn silage	27	180	200	300	234	0	0	-51	-280	-380	-167	-434
Total	F-3				1425	1400	1900	1300	0	0					
2012	F-4	0.7	Sm grain/leg/ryegrass hay	7	105	80	80								
2012	F-4	0.7	Corn silage	27	180	200	300	283	0	0	-2	-280	-380	-167	-434
2013	F-4	0.7	Sm grain/leg/ryegrass hay	7	105	80	80								
2013	F-4	0.7	Corn silage	27	180	200	300	234	0	0	-51	-280	-380	-167	-434
2014	F-4	0.7	Sm grain/leg/ryegrass hay	7	105	80	80								
2014	F-4	0.7	Corn silage	27	180	200	300	256	0	0	-29	-280	-380	-167	-434
2015	F-4	0.7	Sm grain/leg/ryegrass hay	7	105	80	80								
2015	F-4	0.7	Corn silage	27	180	200	300	256	0	0	-29	-280	-380	-167	-434
2016	F-4	0.7	Sm grain/leg/ryegrass hay	7	105	80	80								
2016	F-4	0.7	Corn silage	27	180	200	300	234	0	0	-51	-280	-380	-167	-434
Total	F-4				1425	1400	1900	1263	0	0					
2012	F-6	0.7	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2013	F-6	0.7	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2014	F-6	0.7	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2015	F-6	0.7	Bermuda hybrid pasture	6	180	0	0	177	0	0	-3	0	0	-72	-300
2016	F-6	0.7	Bermuda hybrid pasture	6	180	0	0	156	0	0	-24	0	0	-72	-300
Total	F-6				900	0	0	864	0	0					
2012	F-6,7,8	1.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-6,7,8	1.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2014	F-6,7,8	1.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2015	F-6,7,8	1.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2016	F-6,7,8	1.3	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
Total	F-6,7,8				150	300	300	0	0	0					
2012	F-7,8	1.2	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2013	F-7,8	1.2	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2014	F-7,8	1.2	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
2015	F-7,8	1.2	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2016	F-7,8	1.2	Grass-clover pastur maint	3	30	0	60	0	0	0	-30	0	-60	-45	-180
Total	F-7,8				150	0	300	0	0	0					
2012	F-9	1.0	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-9	1.0	Corn silage	27	180	0	0	283	0	0	-2	0	0	-167	-434
2013	F-9	1.0	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-9	1.0	Corn silage	27	180	0	0	271	0	0	-14	0	0	-167	-434
2014	F-9	1.0	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-9	1.0	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2015	F-9	1.0	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-9	1.0	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2016	F-9	1.0	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-9	1.0	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
Total	F-9				1425	0	0	1322	0	0					
2012	F-10	0.7	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2013	F-10	0.7	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2014	F-10	0.7	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2015	F-10	0.7	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
2016	F-10	0.7	Grass-clover hay maint	4	60	60	60	0	0	0	-60	-60	-60	-60	-240
Total	F-10				300	300	300	0	0	0					
2012	F-10A	0.8	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2013	F-10A	0.8	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2014	F-10A	0.8	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2015	F-10A	0.8	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
2016	F-10A	0.8	Grass-clover pastur maint	3	30	0	0	0	0	0	-30	0	0	-45	-180
Total	F-10A				150	0	0	0	0	0					
2012	F-11,12	0.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2013	F-11,12	0.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2014	F-11,12	0.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2015	F-11,12	0.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
2016	F-11,12	0.1	Bermuda hybrid pasture	8	180	0	0	177	0	0	-3	0	0	-96	-400
Total	F-11,12				900	0	0	885	0	0					

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2012	F-19	0.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-19	0.9	Corn silage	27	180	0	0	283	0	0	-2	0	0	-167	-434
2013	F-19	0.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-19	0.9	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2014	F-19	0.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-19	0.9	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2015	F-19	0.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-19	0.9	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2016	F-19	0.9	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-19	0.9	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
Total	F-19				1425	0	0	1307	0	0					
2012	F-20	1.0	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-20	1.0	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2014	F-20	1.0	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2015	F-20	1.0	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2016	F-20	1.0	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
Total	F-20				150	300	300	0	0	0					
2012	F-23A	0.7	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-23A	0.7	Corn silage	27	180	0	0	283	0	0	-2	0	0	-167	-434
2013	F-23A	0.7	Sm grain/leg/ryegrass hay	7	105	0	0								
2013	F-23A	0.7	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2014	F-23A	0.7	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-23A	0.7	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2015	F-23A	0.7	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-23A	0.7	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2016	F-23A	0.7	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-23A	0.7	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
Total	F-23A				1425	0	0	1307	0	0					
2012	F-23B	1.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2012	F-23B	1.4	Corn silage	27	180	0	0	283	0	0	-2	0	0	-167	-434
2013	F-23B	1.4	Sm grain/leg/ryegrass hay	7	105	0	0								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
		Acres		/Acre											
2013	F-23B	1.4	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2014	F-23B	1.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2014	F-23B	1.4	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2015	F-23B	1.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2015	F-23B	1.4	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
2016	F-23B	1.4	Sm grain/leg/ryegrass hay	7	105	0	0								
2016	F-23B	1.4	Corn silage	27	180	0	0	256	0	0	-29	0	0	-167	-434
Total	F-23B				1425	0	0	1307	0	0					
2012	F-23-pasture	1.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
2013	F-23-pasture	1.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
2014	F-23-pasture	1.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
2015	F-23-pasture	1.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
2016	F-23-pasture	1.3	Grass-clover pastur maint	3	30	30	0	0	0	0	-30	-30	0	-45	-180
Total	F-23-pasture				150	150	0	0	0	0					
2012	F-24	0.9	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-24	0.9	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2014	F-24	0.9	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2015	F-24	0.9	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2016	F-24	0.9	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
Total	F-24				150	300	300	0	0	0					
2012	F-25,26,27	1.4	Grass-clover pastur maint	3	30	60	0	0	0	0	-30	-60	0	-45	-180
2013	F-25,26,27	1.4	Grass-clover pastur maint	3	30	60	0	0	0	0	-30	-60	0	-45	-180
2014	F-25,26,27	1.4	Grass-clover pastur maint	3	30	60	0	0	0	0	-30	-60	0	-45	-180
2015	F-25,26,27	1.4	Grass-clover pastur maint	3	30	60	0	0	0	0	-30	-60	0	-45	-180
2016	F-25,26,27	1.4	Grass-clover pastur maint	3	30	60	0	0	0	0	-30	-60	0	-45	-180
Total	F-25,26,27				150	300	0	0	0	0					
2012	F-29	0.8	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-29	0.8	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2014	F-29	0.8	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2015	F-29	0.8	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2016	F-29	0.8	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180

Year	Field	Size	Crop	Yield Goal /Acre	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
Total	F-29				150	300	300	0	0	0					
2012	F-30	0.4	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
2013	F-30	0.4	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
2014	F-30	0.4	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
2015	F-30	0.4	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
2016	F-30	0.4	Grass-clover pastur maint	3	30	60	30	0	0	0	-30	-60	-30	-45	-180
Total	F-30				150	300	150	0	0	0					
2012	F-35	0.2	Fescue pasture maint	4	120	60	30	116	0	0	-4	-60	-30	-72	-208
2013	F-35	0.2	Fescue pasture maint	4	120	60	30	116	0	0	-4	-60	-30	-72	-208
2014	F-35	0.2	Fescue pasture maint	4	120	60	30	116	0	0	-4	-60	-30	-72	-208
2015	F-35	0.2	Fescue pasture maint	4	120	60	30	116	0	0	-4	-60	-30	-72	-208
2016	F-35	0.2	Fescue pasture maint	4	120	60	30	116	0	0	-4	-60	-30	-72	-208
Total	F-35				600	300	150	580	0	0					
2012	F-38B	0.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2013	F-38B	0.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2014	F-38B	0.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2015	F-38B	0.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
2016	F-38B	0.1	Grass-clover pastur maint	3	30	60	60	0	0	0	-30	-60	-60	-45	-180
Total	F-38B				150	300	300	0	0	0					

¹ Fertilizer Recs are the crop fertilizer recommendations. The N rec accounts for any N credit from previous legume crop.

² Nutrients Applied are the nutrients expected to be available to the crop from that year's manure applications plus nutrients from that year's commercial fertilizer applications and nitrates from irrigation water. With a double-crop year, the total nutrients applied for both crops and the year's balances are listed on the second crop's line.

³ For N, Nutrients Applied minus Fertilizer Recs for indicated crop year. Also includes amount of residual N expected to become available that year from prior years' manure applications. For P₂O₅ and K₂O, Nutrients Applied minus Fertilizer Recs *through* the indicated crop year, with positive balances carried forward to subsequent years. Negative values indicate a potential need to apply additional nutrients.

⁴ Nutrients Applied minus amount removed by harvested portion of crop through the indicated year. Positive balances are carried forward to subsequent years.

¤ Indicates a custom fertilizer recommendation in the Fertilizer Recs column.

^a Indicates in the Balance After Recs N column that the legume crop is assumed to utilize some or all of the supplied N.

[†] Indicates in the Balance After Recs N column that the value includes residual N expected to become available that year from prior years' manure applications.

6.9. Manure Inventory Annual Summary

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Imported	Total Transferred In	Total Applied	Total Exported	Total Transferred Out	On Hand at End of Period	Units
Storage pond	Jan '12 - Dec '12	2,000,000	8,000,000	0	0	7,515,000	0	0	2,485,000	Gal
Dry pack	Jan '12 - Dec '12	210	700	0	0	658	0	0	252	Ton
calf barn	Jan '12 - Dec '12	20	190	0	0	169	0	0	41	Ton
All Sources (liquid)	Jan '12 - Dec '12	2,000,000	8,000,000	0	0	7,515,000	0	0	2,485,000	Gal
All Sources (solid)	Jan '12 - Dec '12	230	890	0	0	826	0	0	294	Ton
Storage pond	Jan '13 - Dec '13	2,485,000	8,000,000	0	0	7,968,700	0	0	2,516,300	Gal
Dry pack	Jan '13 - Dec '13	252	700	0	0	735	0	0	218	Ton
calf barn	Jan '13 - Dec '13	41	190	0	0	181	0	0	50	Ton
All Sources (liquid)	Jan '13 - Dec '13	2,485,000	8,000,000	0	0	7,968,700	0	0	2,516,300	Gal
All Sources (solid)	Jan '13 - Dec '13	294	890	0	0	916	0	0	268	Ton
Storage pond	Jan '14 - Dec '14	2,516,300	8,000,000	0	0	8,166,900	0	0	2,349,400	Gal
Dry pack	Jan '14 - Dec '14	218	700	0	0	696	0	0	222	Ton
calf barn	Jan '14 - Dec '14	50	190	0	0	198	0	0	42	Ton
All Sources (liquid)	Jan '14 - Dec '14	2,516,300	8,000,000	0	0	8,166,900	0	0	2,349,400	Gal
All Sources (solid)	Jan '14 - Dec '14	268	890	0	0	894	0	0	264	Ton
Storage pond	Jan '15 - Dec '15	2,349,400	8,000,000	0	0	8,166,350	0	0	2,183,050	Gal
Dry pack	Jan '15 - Dec '15	222	700	0	0	737	0	0	184	Ton
calf barn	Jan '15 - Dec '15	42	190	0	0	192	0	0	40	Ton
All Sources (liquid)	Jan '15 - Dec '15	2,349,400	8,000,000	0	0	8,166,350	0	0	2,183,050	Gal
All Sources (solid)	Jan '15 - Dec '15	264	890	0	0	929	0	0	224	Ton
Storage pond	Jan '16 - Dec '16	2,183,050	8,000,000	0	0	8,166,900	0	0	2,016,150	Gal
Dry pack	Jan '16 - Dec '16	184	700	0	0	672	0	0	212	Ton
calf barn	Jan '16 - Dec '16	40	190	0	0	192	0	0	38	Ton
All Sources (liquid)	Jan '16 - Dec '16	2,183,050	8,000,000	0	0	8,166,900	0	0	2,016,150	Gal
All Sources (solid)	Jan '16 - Dec '16	224	890	0	0	864	0	0	250	Ton

6.10. Fertilizer Material Annual Summary

Product Analysis	Plan Period	Product Needed Jan - Aug	Product Needed Sep - Dec	Total Product Needed	Units
28-0-0	Jan '12 - Dec '12	4,353	0	4,353	Gal
46-0-0	Jan '12 - Dec '12	69,605	25	69,630	Lbs
34-0-0	Jan '12 - Dec '12	7,375	0	7,375	Lbs
28-0-0	Jan '13 - Dec '13	857	0	857	Gal
46-0-0	Jan '13 - Dec '13	26,053	25	26,078	Lbs
34-0-0	Jan '13 - Dec '13	7,375	0	7,375	Lbs
28-0-0	Jan '14 - Dec '14	319	0	319	Gal
46-0-0	Jan '14 - Dec '14	20,125	25	20,150	Lbs
34-0-0	Jan '14 - Dec '14	7,375	0	7,375	Lbs
28-0-0	Jan '15 - Dec '15	319	0	319	Gal
46-0-0	Jan '15 - Dec '15	20,125	25	20,150	Lbs
34-0-0	Jan '15 - Dec '15	7,375	0	7,375	Lbs
28-0-0	Jan '16 - Dec '16	328	0	328	Gal
46-0-0	Jan '16 - Dec '16	18,521	25	18,546	Lbs
34-0-0	Jan '16 - Dec '16	3,550	0	3,550	Lbs
32-0-0	Jan '16 - Dec '16	140	0	140	Lbs

6.11. Whole-farm Nutrient Balance (Manure-spreadable Area)

	N (Lbs)	P ₂ O ₅ (Lbs)	K ₂ O (Lbs)
Total Manure Nutrients on Hand at Start of Plan ¹	52,210	14,716	33,015
Total Manure Nutrients Collected ²	1,014,175	276,685	623,915
Total Manure Nutrients Imported ³	0	0	0
Total Manure Nutrients Exported ⁴	0	0	0
Total Manure Nutrients on Hand at End of Plan ⁵	52,762	14,884	33,346
Total Manure Nutrients Applied ⁶	1,013,717	277,894	623,548
Available Manure Nutrients Applied ⁷	542,337	277,894	623,548
Commercial Fertilizer Nutrients Applied ⁸	92,500	0	0
Available Nutrients Applied ⁹	634,837	277,894	623,548
Nutrient Utilization Potential ¹⁰	767,340	393,540	1,109,758
Nutrient Balance of Spreadable Acres ^{11*}	-132,503	-115,646	-486,210
Average Nutrient Balance per Spreadable Acre per Year ^{12*}	-37	-32	-135

1. Values indicate total manure nutrients present in storage(s) at the beginning of the plan.
2. Values indicate total manure nutrients collected on the farm.
3. Values indicate total manure nutrients imported onto the farm.
4. Values indicate total manure nutrients exported from the farm to an external operation.
5. Values indicate total manure nutrients present in storage(s) at the end of plan.
6. Values indicate total nutrients present in land-applied manure. Losses due to rate, timing and method of application are not included in these values.
7. Values indicate available manure nutrients applied on the farm based on rate, time and method of application. These values are based on the total manure nutrients applied (row 6) after accounting for state-specific nutrient losses due to rate, time and method of application.
8. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
9. Values are the sum of available manure nutrients applied (row 7) and commercial fertilizer nutrients applied (row 8).
10. Values indicate nutrient utilization potential of crops grown. For N the value generally is based on crop N recommendation for non-legume crops and crop N uptake or other state-imposed limit for N application rates for legumes. P₂O₅ and K₂O values generally are based on fertilizer recommendations or crop removal (whichever is greatest).
11. Values indicate available nutrients applied (row 9) minus crop nutrient utilization potential (row 10). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
12. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres (row 11) by the number of spreadable acres in plan and by the length of the plan in years. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

Whole-farm Nutrient Balance (Non-manure-spreadable Area)

	N (Lbs)	P ₂ O ₅ (Lbs)	K ₂ O (Lbs)
Commercial Fertilizer Nutrients Applied ¹	8,359	0	0
Nutrient Utilization Potential ²	10,845	4,085	4,390
Nutrient Balance of Non-spreadable Acres ^{3*}	-2,486	-4,085	-4,390
Average Nutrient Balance per Non-spreadable Acre per Year ^{4*}	-29	-47	-51

1. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
2. Values indicate nutrient utilization potential of crops grown based on crop fertilizer recommendations.
3. Values indicate commercial fertilizer nutrients applied (row 1) minus crop nutrient utilization potential (row 2). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
4. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of non-spreadable acres (row 3) by number of non-spreadable acres in plan. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

6-12. Projected Soil P & K levels.

Projected Soil P And K Levels

Plan File: S:\TENNESSEE-projects\Rex Calfee\Riverland Dairy CNMP_2012-2016\Riverland_Dairy-CNMP-2012-2016.mmp
Last Saved: 1/13/2012

Operation: Riverland Dairy Farm

State: Tennessee

Init. File Rev: 11/8/2011

Field ID	Sub ID	P Level At Start Of Plan	P Level At End Of Plan	K Level At Start Of Plan	K Level At End Of Plan	Units
B-4		23	42	30	27	Lb/A
B-6		18	37	184	181	Lb/A
F-1		90	87	415	388	Lb/A
F-2		120	117	309	281	Lb/A
F-2,3-hay		127	89	282	222	Lb/A
F-3		17	14	80	73	Lb/A
F-4		14	11	73	66	Lb/A
F-5		35	29	152	92	Lb/A
F-6		399	378	668	375	Lb/A
F-6,7,8		14	10	77	72	Lb/A
F-7,8		115	106	55	55	Lb/A
F-9		114	111	300	273	Lb/A
F-10		11	10	59	49	Lb/A
F-10A		77	72	264	224	Lb/A
F-10B		12	10	61	41	Lb/A
F-11,12		267	256	449	349	Lb/A
F-13,14		52	47	117	78	Lb/A
F-15-18,36,37		129	123	39	29	Lb/A
F-19		145	139	405	365	Lb/A
F-20		10	7	24	14	Lb/A
F-21,22		50	45	427	385	Lb/A
F-23A		95	90	331	83	Lb/A
F-23B		148	142	442	415	Lb/A
F-23-pasture		50	45	427	399	Lb/A
F-24		12	8	35	25	Lb/A
F-25,26,27		24	20	360	320	Lb/A
F-29		19	15	75	50	Lb/A
F-30		18	15	160	135	Lb/A
F-33		19	17	228	145	Lb/A
F-35		13	12	200	185	Lb/A
F-38A		8	6	49	39	Lb/A
F-38B		7	6	96	76	Lb/A
North Fld		39	47	175	160	Lb/A

Notes

Equations used to determine change in soil test P and K:

Change in P (Lb/A) = NET\P2O5 / 9

Change in K (Lb/A) = NET\K2O / 4

Section 7. Feed Management

Optional, not implemented at this time.

Section 8. Other Utilization Options

No alternative utilization options are implemented at this time.

Section 9. Record Keeping Forms Annual Reports 2012-2016

Section 10. References

10.1. Publications

Crop Fertilizer Recommendations

"Lime and Fertilizer Recommendations for the Various Crops of Tennessee," BEES Info #100, Aug 2008
<http://soilplantandpest.utk.edu/publications/soilfertilizerpubs.htm>

Manure Application Setback Features/Distances

Nutrient Management Standard 590
[http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_\(590\)_Standard.doc](http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

TN DEQ Rule 1200-4-5-.14(17)(d)
<http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf>

TN DEQ Rule 1200-4-5-.14(17)(d)
<http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf>

Manure Nutrient Availability

"Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94
http://wastemgmt.ag.utk.edu/ExtensionProjects/extension_publications.htm

Phosphorus Assessment

"Tennessee Phosphorus Index," Tennessee NRCS, Nov. 2001

Practice Standards

Tennessee NRCS Nutrient Management Standard (590), Jan. 2003
[http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_\(590\)_Standard.doc](http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

10.2. Software and Data Sources

MMP Version	MMP 0.3.1.0
MMP Plan File	Riverland_Dairy-CNMP-2012-2016.mmp 1/13/2012 9:10:42 AM
MMP Initialization File for Tennessee	11/8/2011
MMP Soils File for Tennessee	8/29/2011
Phosphorus Assessment Tool	2009.02.20
NRCS Conservation Plan(s)	n/a
RUSLE2 Library	Version: 1.32.3.0 Build: Dec 17 2007 Science: 20061020
RUSLE2 Database	moses-IL.gdb